GPS AutoSteer System
Installation Manual

John Deere MFWD Valve Install Vehicles

Supported Models

7200	7210
7400	7410
7600	7510
7700	7610
7800	7710
	7810

PN: 602-0212-01-A

LEGAL DISCLAIMER

Note: Read and follow ALL instructions in this manual carefully before installing or operating the AutoSteer system.

Note: Take careful note of the safety information in the Safety Information section and throughout this manual.

The manufacturer disclaims any liability for damage or injury that results from failure to follow the instructions and warnings set forth herein.

Please take special note of the following warnings:

1. There is NO obstacle avoidance system included in the manufacturer’s product. Therefore, users must always have an operator on the equipment when the AutoSteer system is in use to look for any obstacles including people, animals, trees, ditches, buildings, etc.
2. During installation of the AutoSteer system and during the Calibration and Tuning processes the vehicle's wheels turn from side to side and the vehicle moves. Be sure that all people and obstacles are clear of the vehicle before installation, calibration and tuning, or use of the AutoSteer system.
3. Use of the AutoSteer system is NOT permitted while the vehicle is on public roads or in public areas. Ensure that the system is OFF before driving on roads or in public areas.

Special Requirements

Tools

This list consists of the tools required to complete the installation. The installer is assumed to have a complete set of common installation tools.

#2 Phillips screwdriver	3/8” open end wrench	13mm open end wrench
#3 Phillips screwdriver	1/2” open end wrench	17mm open end wrench
1/8” Allen wrench	9/16” open end wrench (need 2)	19mm open end wrench
3/16” Allen wrench	11/16” open end wrench	30mm open end wrench
5/32” Allen wrench	3/4” open end wrench	8mm socket and ratchet
1/4” Allen wrench	13/16” open end wrench	13mm socket and ratchet
1/2” socket and ratchet	15/16” open end wrench	17mm socket and ratchet
9/16” socket and ratchet	1-1/16” open end wrench	19mm socket and ratchet
15/16” socket and ratchet	1/2” ratchet wrench	24mm socket and ratchet
Step ladder	Hack saw	30mm socket and ratchet
Utility knife	Side cutters	Tape measure, 10 ft (3 m) minimum
Pull pole (for pulling hoses under cab)	Electrical tape	

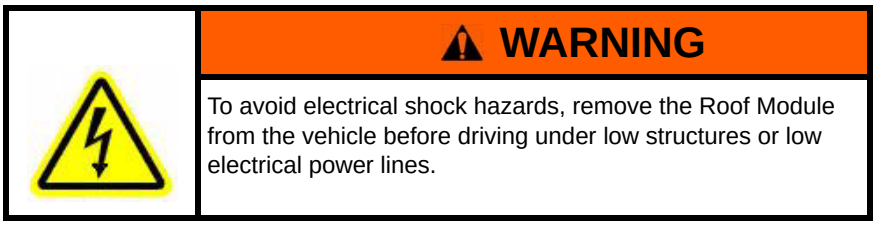
Safety Information

Warning Alerts

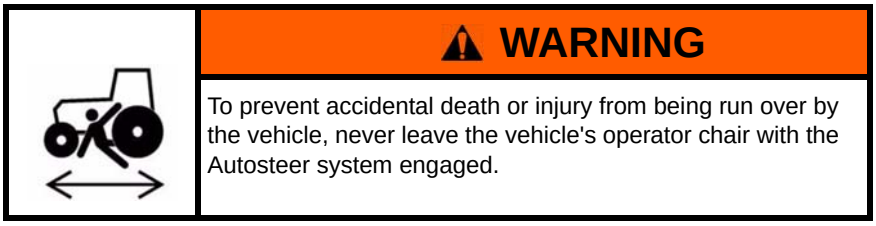
The AutoSteer system installer and manufacturer disclaim any responsibility for damage or physical harm caused by failure to adhere to the following safety requirements:

- As the operator of the vehicle, you are responsible for its safe operation.
- The AutoSteer system is *not* designed to replace the vehicle's operator.

Note: Verify that all screws, bolts, nuts, hose connections, and cable connections are tight after the final installation of the AutoSteer system on the vehicle.


⚠ WARNING
To avoid electrical shock hazards, remove the Roof Module from the vehicle before driving under low structures or low electrical power lines.

⚠ WARNING
Ensure that you are in a stable position on the vehicle platform when installing or removing the Roof Rail and Roof Module so you do not fall.


⚠ WARNING
To prevent accidental death or injury from being run over by the vehicle, never leave the vehicle's operator chair with the Autosteer system engaged.

⚠ WARNING

High-Pressure Fluid Hazard

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.

⚠ WARNING

To understand the potential hazards associated with the operation of AutoSteer equipment, read this manual before installing the AutoSteer system on a vehicle.

⚠ WARNING

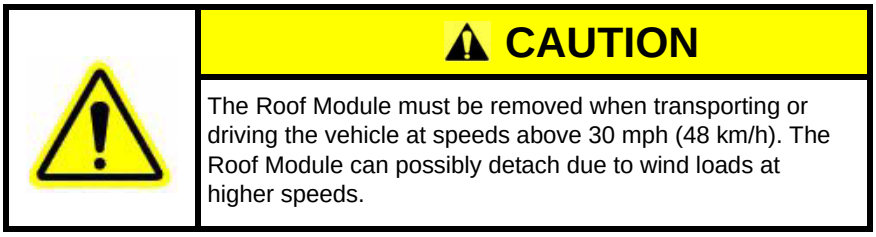
To prevent the accidental engagement of GPS steering and loss of vehicle control while driving on roads, shut down the AutoSteer system (exit the program). Never drive on roads or in public areas with the AutoSteer system turned on.

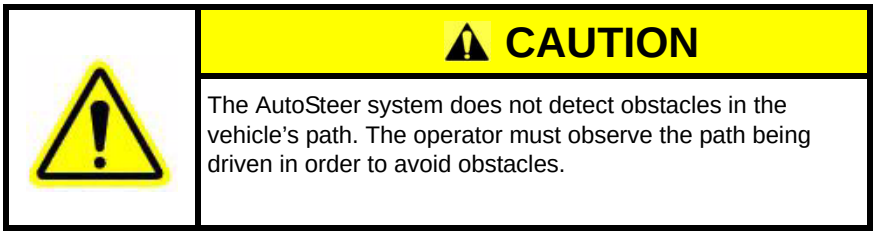
⚠ WARNING

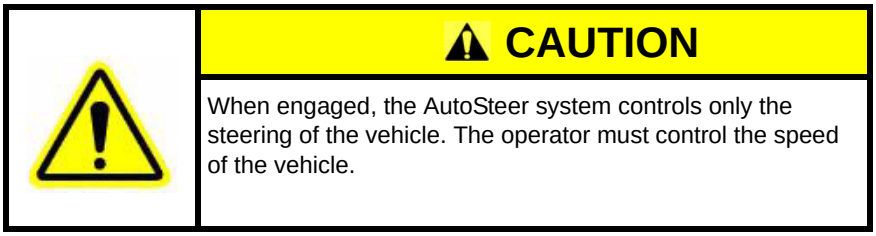
Do not stand close to the wheels and do not move the machine while you are adjusting the Relief Valve. Turn off the engine and engage the parking brake before standing under or next to the machine.

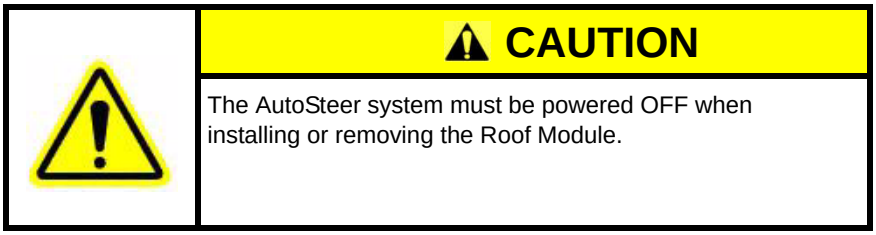
Caution Alerts

The AutoSteer system installer and manufacturer disclaim any responsibility for damage or physical harm caused by failure to adhere to the following safety requirements:


CAUTION
The Roof Module must be removed when transporting or driving the vehicle at speeds above 30 mph (48 km/h). The Roof Module can possibly detach due to wind loads at higher speeds.


CAUTION
The AutoSteer system does not detect obstacles in the vehicle's path. The operator must observe the path being driven in order to avoid obstacles.


CAUTION
When engaged, the AutoSteer system controls only the steering of the vehicle. The operator must control the speed of the vehicle.



CAUTION

The Roof Module must always be firmly secured to the Roof Rail using the supplied hardware whenever the vehicle is in operation to prevent the Roof Module from releasing from its bracket and falling.

Vehicle Requirements

The vehicle must be equipped with a fully functional Power Beyond System. The Power Beyond system provides the following hydraulic ports on the rear of the vehicle:

- Pressure
- Retun/Tank
- Load Sense

The vehicle steering and hydraulic systems must be in good working order before installing the AutoSteer system. Check for loose or worn parts. Drive the vehicle and confirm that it steers straight and the wheels can be turned from lock to lock. Check the steering system hydraulic hoses and connections to ensure there are no oil leaks.

The vehicle electrical system and battery must be in good working order.

The vehicle should be fully cleaned before installing the AutoSteer system. A clean vehicle will improve the overall installation and cable routing and will also reduce the chance for oil contamination when the hydraulic connections are opened.

Important Information

This installation manual contains valuable information for servicing the AutoSteer system. After the installation is complete, store this manual in a safe place for future reference.

Note: Verify that all screws, bolts, nuts, hose connections, and cable connections are tight after the final installation of the AutoSteer system on the vehicle.

This installation requires that the Pressure Relief Valve on the Steering Valve be adjusted after the system has been installed but prior to calibration and tuning. After a preliminary hydraulic leak test, follow the procedure for setting the Pressure Relief Valve.

Technical Support

Refer to your Display user manual for technical support information.

Contact Information

Refer to your Display user manual for contact information.

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Installation Overview

This **Installation Overview** chapter information is provided in the following sections:

- *Vehicle Inspection*
- *Kit Overview*
  - *Kit Components*
- *Installation Procedure Outline*
- *Cable Diagram*

This installation guide describes the installation of the AutoSteer system on several models of the John Deere MFWD tractors as listed on the front cover. The same AutoSteer installation kit PN: 188-0022-01 can also be installed on other John Deere tractor models as described in a separate manual. Refer to the correct installation guide for your tractor model.

The vehicle specific sub-assemblies for the vehicle series are listed in *Table 1-1*.

Note: If you are installing an electric steering wheel actuator such as OnTrac II, skip the Steering Valve, SA Module, and SA Module Harness installation information in this manual and refer to your electric steering product manual for further instructions.

Vehicle Inspection

Before installing the AutoSteer system, confirm the vehicle's steering system is in good working order. Drive the vehicle and verify the vehicle's correct working order. Also, ensure the following system operations and components:

- Check to see if you can turn the steered wheels from lock to lock.
- Ensure the vehicle steers straight.
- Check for loose or worn steering components.
- Ensure the hydraulic fluid level is correct.
- Service the vehicle if the steering is not in good working order.

Kit Overview

This Kit Overview section is divided into sub-sections for each of its assemblies and their components are described in the following sections.

Kit Components

This assembly is shown in *Figure 1-1* and its components are defined in *Table 1-1*.

Figure 1-1 Kit Components (PN: 188-0022-01)

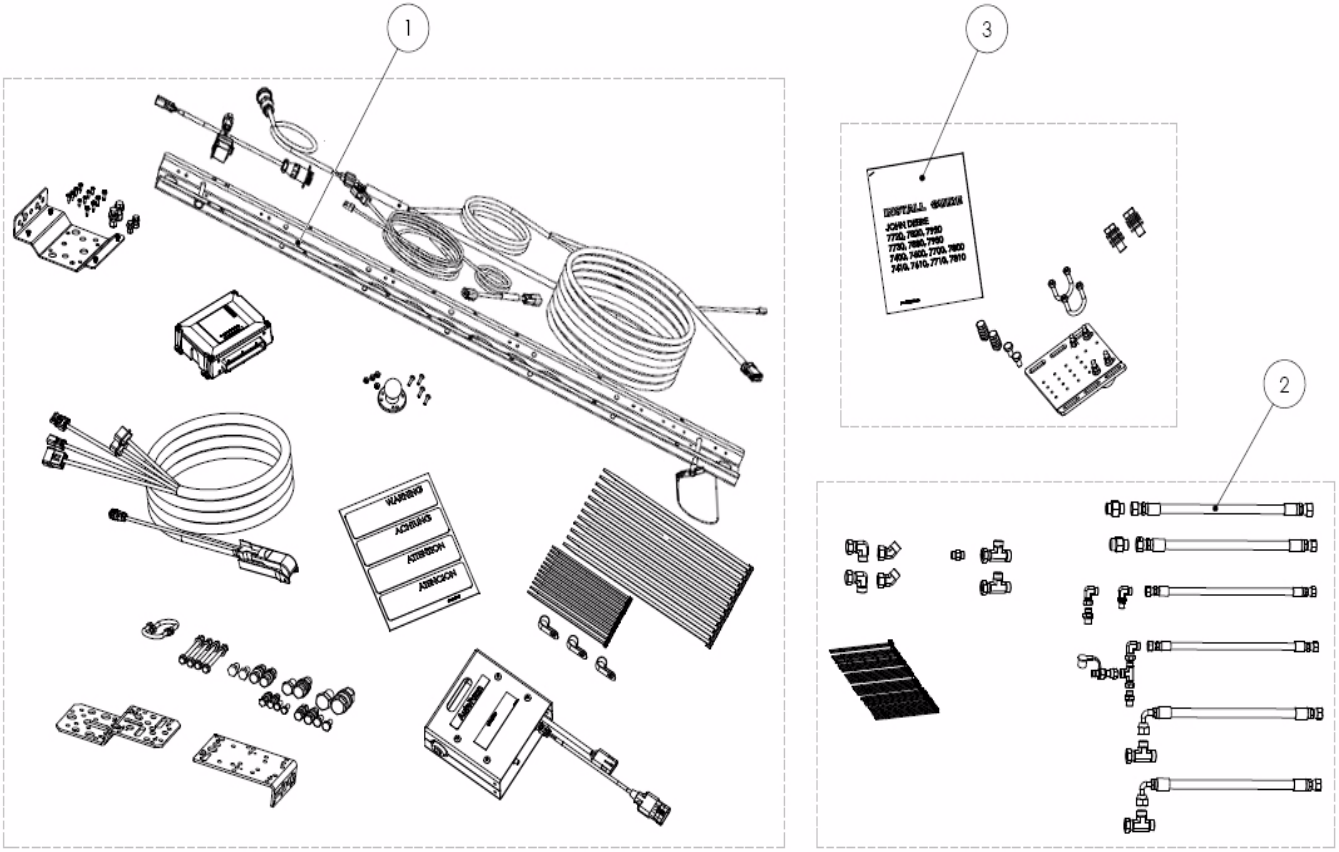


Table 1-1 Kit Components Descriptions (PN: 188-0022-01)

Item	Component	Part Number
1.	Steering Valve Kit	153-0001-01
2.	Hose Kit	500-0321-01
3.	Bracket Kit	152-0020-01

Assemblies

This vehicle installation kit contains the following components:

- Steering Valve Kit Components
- Hose Kit Components
- Bracket Kit Components

Steering Valve Kit Components

Figure 1-2 Steering Valve Kit Components (PN: 153-0001-01)

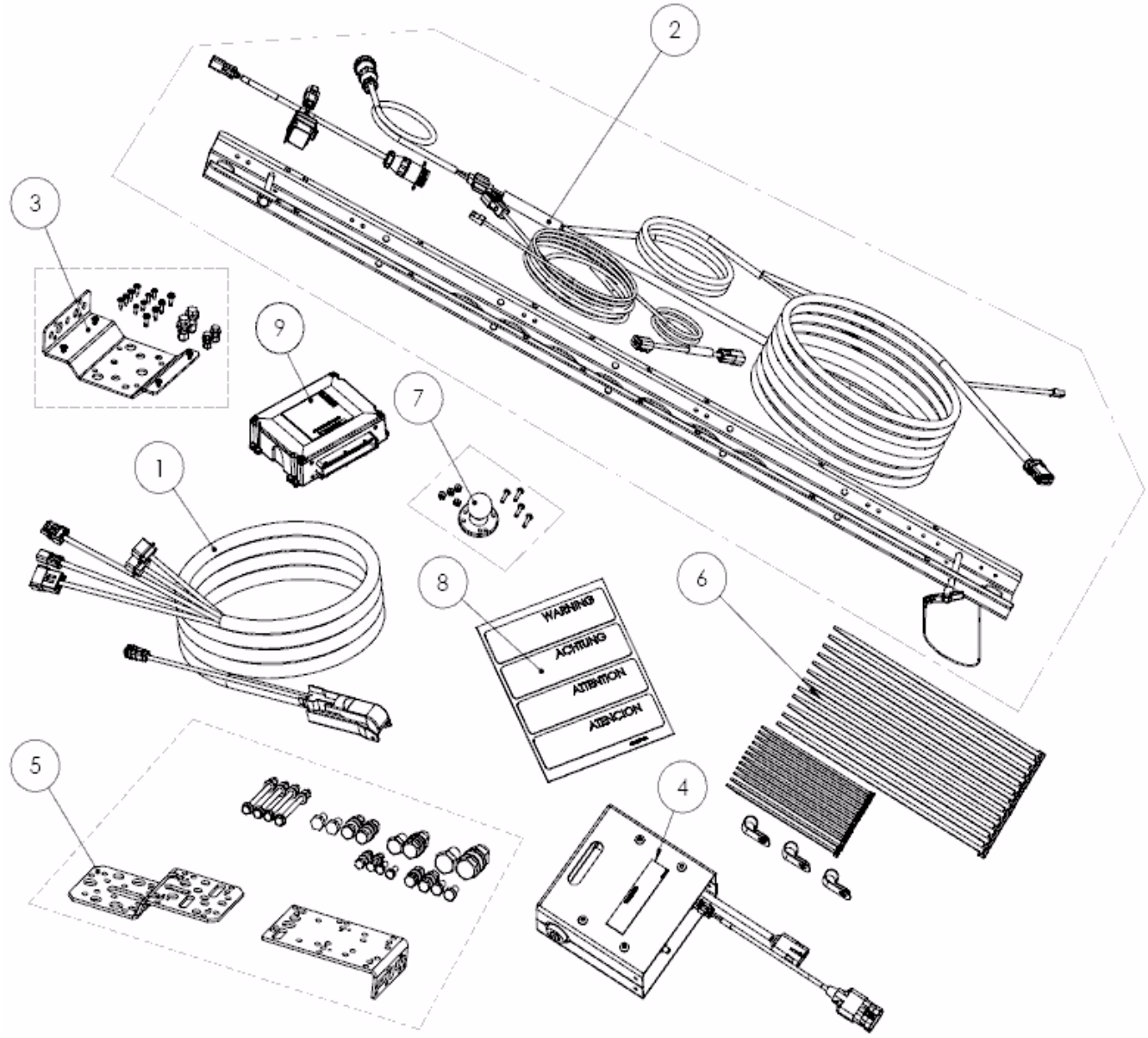


Table 1-2 Steering Valve Kit Components (PN: 153-0001-01)

Item	Component	Part Number
1.	SA Module Harness - Wheeled	201-0371-02
2.	Common Installation Kit	200-0497-02
3.	SA Module Bracket	200-0190-01
4.	Steering Valve Assembly	200-0457-01
5.	Steering Valve Bracket Kit	200-0434-01
6.	Mounting Hardware	200-0076-01
7.	Display Mounting Base Assembly	200-0508-01
8.	Warning Labels	603-0074-01
9.	SA Module Assembly	200-0206-01

Hose Kit Components

Figure 1-3 Hose Kit Components (PN: 500-0321-01)

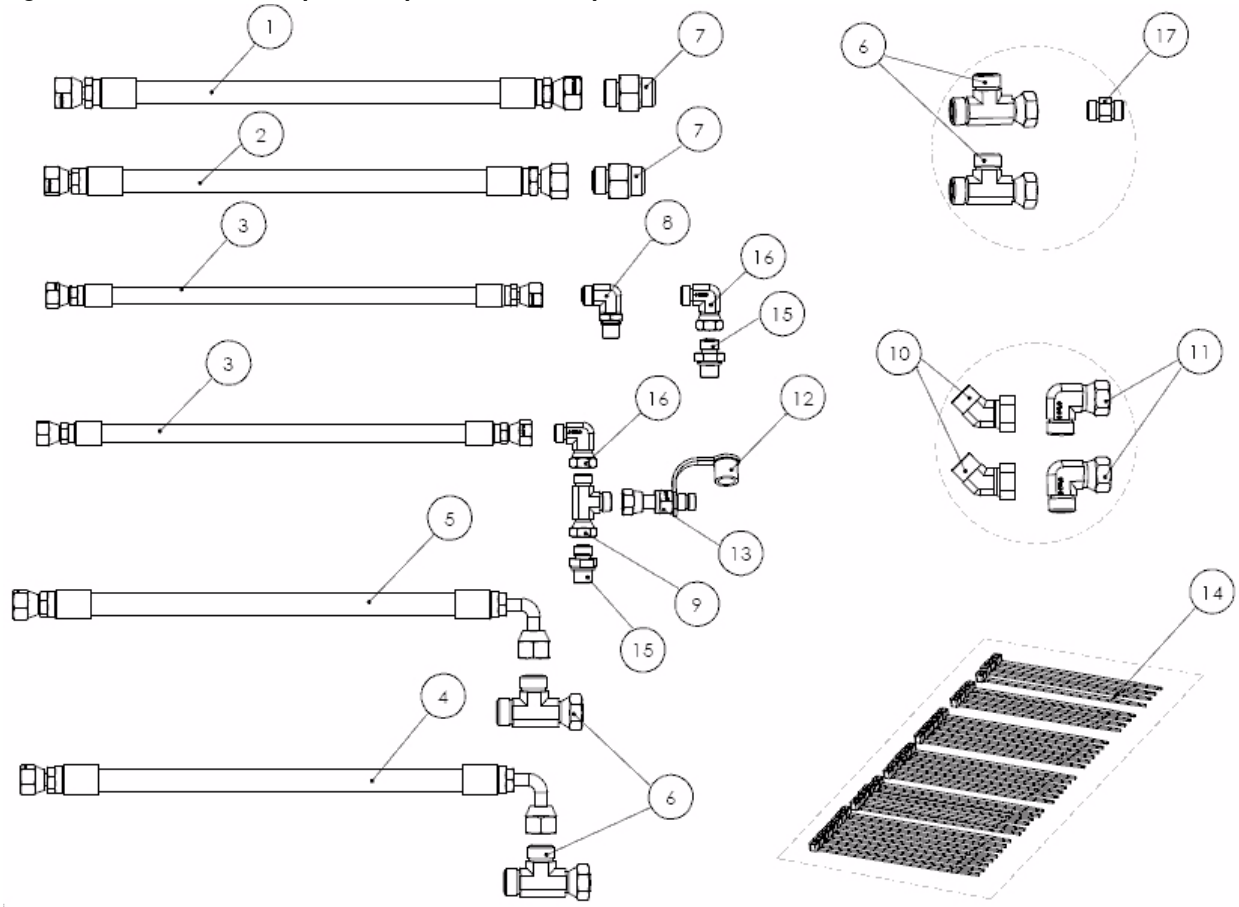


Table 1-3 Hose Kit Components (PN: 500-0321-01)

Item	Component	Part Number
1.	Hose, 3/8” x 132" -8F ORFS x -8F ORFS	F451TC-JCJC080806-132
2.	Hose, 3/8” x 132" -6F ORFS x -8F ORFS	F451TC-JCJC060806-132
3.	Hose, 1/4” x 126" -4F ORFS x -4F ORFS	F451TC-JCJC040404-126
4.	Hose, 3/8” x 54" -6F ORFS x -8F ORFS 90 Deg.	F451TC-JCJ9060806-54
5.	Hose, 3/8” x 66" -6F ORFS x -8F ORFS 90 Deg.	F451TC-JCJ9060806-66
6.	Adapter, -8 Run Tee ORFS F-M-M	8 R6LO-S
7.	Adapter, -8 M ORFS x M22 O-RING	8M22F87OMLO
8.	Adapter, 90 Deg. Elbow -4 M ORFS x M12 O-RING	4M12C87OMLO
9.	Adapter, Run Tee -4 F-M-M -ORFS	4 R6LO
10.	Adapter, 45 Deg. Elbow -8 ORFS	8 V6LO-S
11.	Adapter, 90 Deg. Elbow -8 ORFS	8 C6LO
12.	Dust Cap, 1/8” (PD6-285)	PD6-285
13.	Adapter, Test Port Nipple 1/8” x -4F ORFS	PD34BTL
14.	Cable Ties	200-0467-01
15.	Adapter, M14 x -4M ORFS	4M14F87OMLO-S
16.	Adapter, 90 Deg. Elbow -4 ORFS	4 C6LO
17.	Adapter, Union -4 ORFS	4 HLO-S

Bracket Kit Components

Figure 1-4 Bracket Kit Components (PN: 152-0020-01)

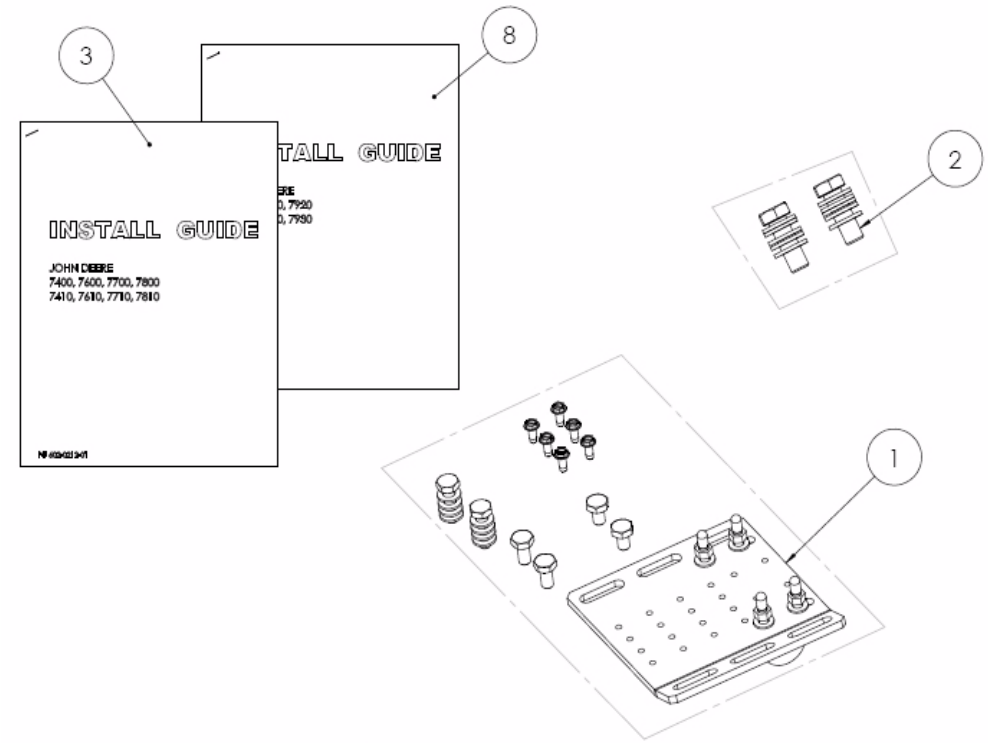


Table 1-4 Bracket Kit Components (PN: 152-0020-01)

Item	Component	Part Number
1.	Display Bracket Assembly	200-0469-02
2.	Roof Rail Mounting Assembly	200-0238-01
3.	Hardware Installation Manual, JD-7810/7800	602-0212-01
8.	Hardware Installation Manual, JD-7720/7820/7920	602-0260-01

Installation Procedure Outline

1. Verify shipped components.

Note: *Step 2*, *Step 3*, *Step 4*, *Step 5*, and *Step 9* are skipped if installing an electric steering actuator.

---

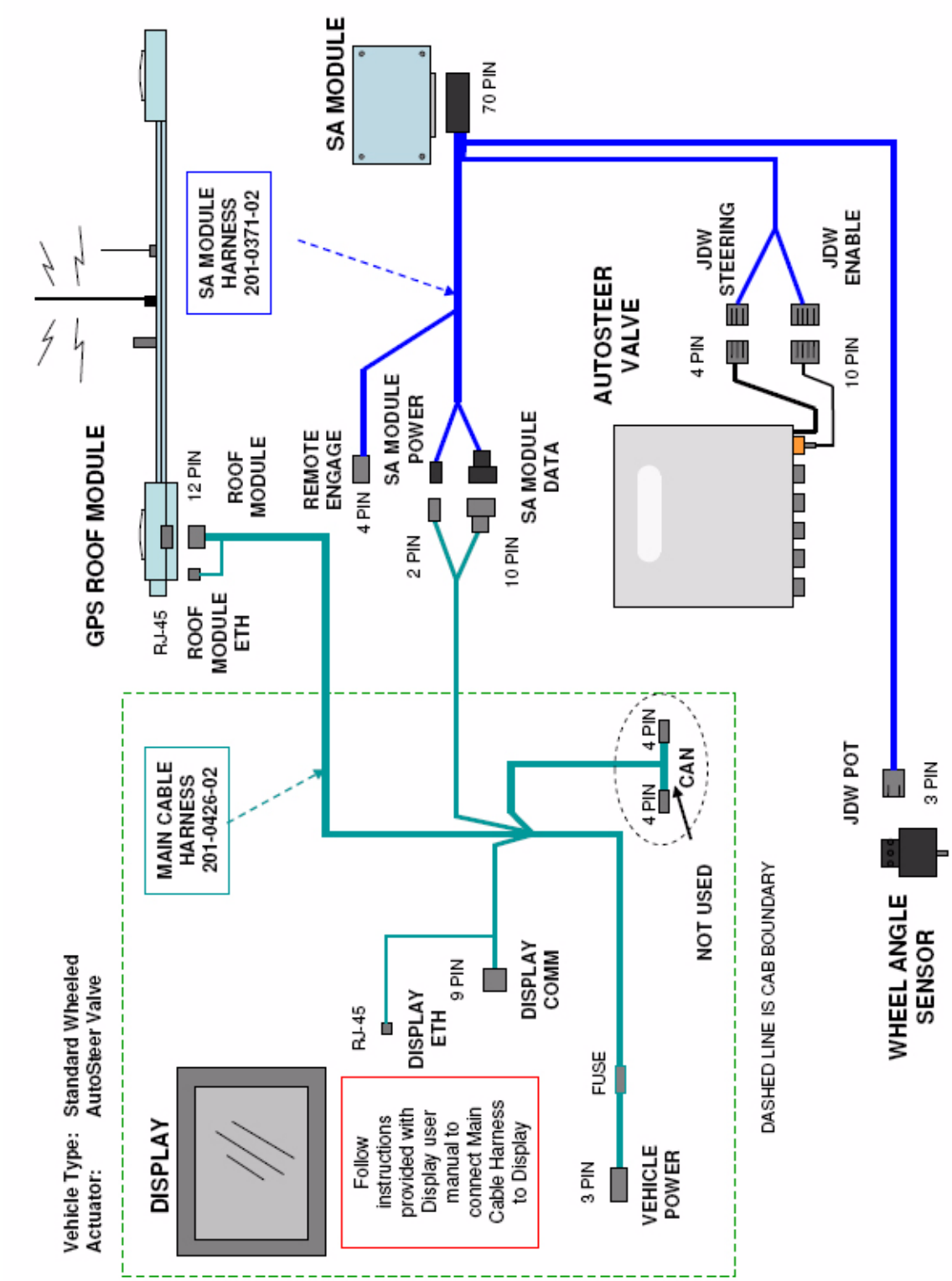
2. Install the Hydraulic Steering Valve Assembly.
3. Install the Hydraulic Hoses.
4. Install the Wheel Angle Sensor. (Optional)
5. Install the SA Module.
6. Install the Roof Rail on the cab roof.
7. Install the Roof Module on the Roof Rail.
8. Install the Display Mounting bracket in the cab.
9. Install the SA Module Harness.
10. Install the Main Cable Harness.
11. Install the Display using a RAM Mount Arm.
12. Connect the Main Cable Harness to the Display connections (Display Comm, Display Eth, and Vehicle Power).

Note: Instructions for connecting the vehicle kit cables to the Display can be found in the Display user manual.

---

13. Verify all connectors are properly coupled and secured.
14. Start the vehicle and check for oil leaks.
15. Power ON the AutoSteer system.
16. Adjust the Pressure Relief Valve on the Steering Valve.
17. Calibrate the vehicle.
18. Tune the vehicle.
19. Verify the system has been installed properly and operates satisfactorily.

Cable Diagram



Steering Valve Installation

The **Steering Valve Installation** chapter information is provided in the following sections:

- *Steering Valve Installation Procedure Overview*
- *Verify a Power Beyond Kit has been Installed*
- *Prepare the Steering Valve for a Power Beyond Installation*
  - *Steering Valve Front Ports Overview*
  - *Valve Preparation Procedure*
- *Install the Steering Valve*
- *Hydraulic Hose Overview*
  - *Steering Valve Port Overview*
  - *Hose Connection Overview*
- *Hose Connection Procedure*
  - *Power Beyond and Orbitrol LS Hydraulic Connections*
  - *Attach Hoses from Power Beyond and LS Orbitrol Ports to the Steering Valve*
  - *Steering Line Hose Connection*
  - *Connect Pressure Transducer*
- *Pressure Relief Valve Adjustment*
- *Steering Valve Installation Checklist*

Note: Only technicians trained for hydraulic valve installations should perform the installation procedures in this chapter. If the vehicle requires a hydraulic Steering Valve to be installed ensure a trained technician is available for the installation.

Steering Valve Installation Procedure Overview

1. Verify a Power Beyond kit has been installed on the vehicle.

2. Prepare the Steering Valve for a Power Beyond installation.

3. Install the Steering Valve bracket and Steering Valve on the vehicle.

4. Connect the six hoses between the Steering Valve and the vehicle.

5. Check for oil leaks.

6. Perform a manual functional test to confirm correct Steering Valve operation.

⚠ WARNING

High-Pressure Fluid Hazard

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.

Verify a Power Beyond Kit has been Installed

This installation requires that a Power Beyond kit be installed on the vehicle prior to installing the Steering Valve. The Power Beyond kit provides the required ports for Pressure, Return, and Load Sense. On most vehicles, the Power Beyond kit can be identified by looking at the rear of the vehicle on the left side of the valve stack. If the Power Beyond kit has not been installed, it must be ordered and installed prior to beginning the Steering Valve installation.

Figure 2-1 Power Beyond Plate Attachment

Note: *Figure 2-1* shows only the Power Beyond plate attachment with no ports. If the Power Beyond kit has been installed prior to the installation of the Steering Valve, additional hose fittings and/or plugs may be present on the existing Power Beyond plate. These instructions assume that no fittings have been installed. If necessary, modify the procedure to take into account differences in the existing Power Beyond installation.

Prepare the Steering Valve for a Power Beyond Installation

Prior to installing the Steering Valve on to the vehicle, the Steering Valve must be configured for use on a Power Beyond system. This requires the installer to verify the proper plugs and orifices have been installed in the access ports on the Steering Valve. This procedure can be performed after the Steering Valve has been installed on the vehicle; however it is much easier to do this prior to the installation.

Steering Valve Front Ports Overview

Figure 2-2 shows the ports on the front of the Steering Valve that will be accessed after the front cover has been removed. There are other ports and orifices on the Steering Valve, but the ones described here are the only ones that will need to be modified for a Power Beyond installation. A plug is inserted into Port **13B** to allow the Steering Valve to work in a Power Beyond installation.

Table 2-1 shows the factory default positions of all the access ports and the positions they should be in for a Power Beyond installation. Ports **13A** and **13C** are not accessed in this installation and are thus not identified in *Figure 2-2*.

Figure 2-2 Ports on the Front of Steering Valve

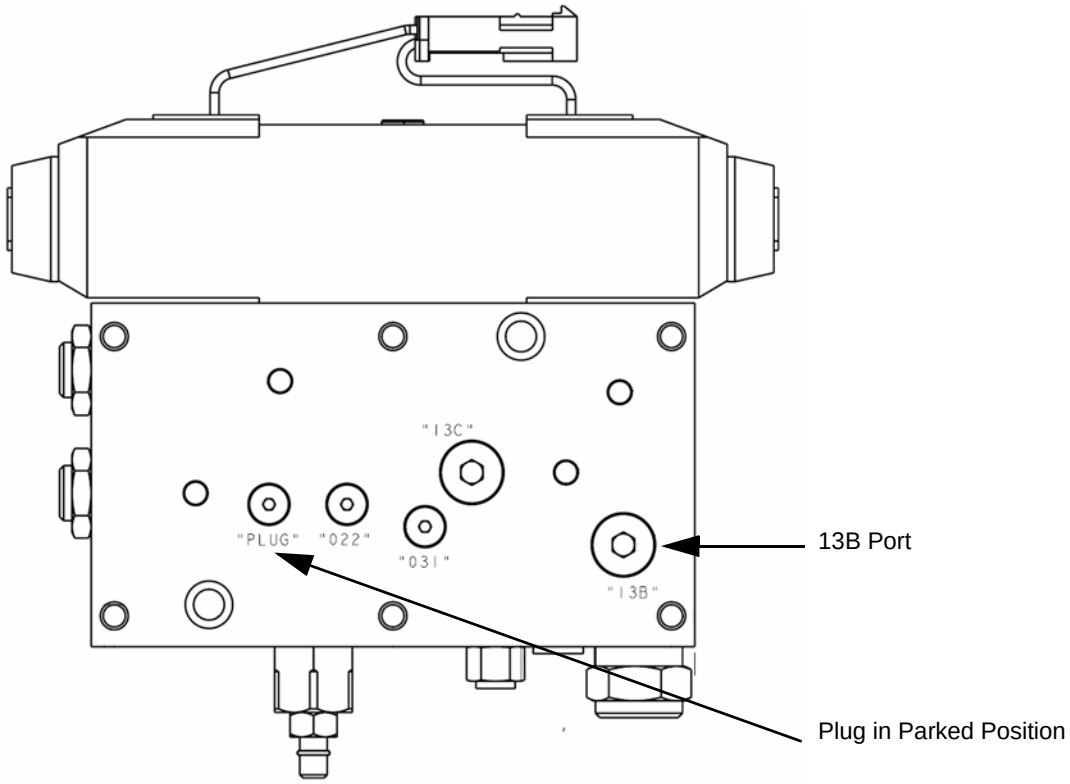


Table 2-1 Plug and Orifice Configuration Summary

Type of Installation	13A	13B	13C
Factory Default Configuration	Plug	Open	Plug
Power Beyond Configuration	Plug	Plug	Plug

Valve Preparation Procedure

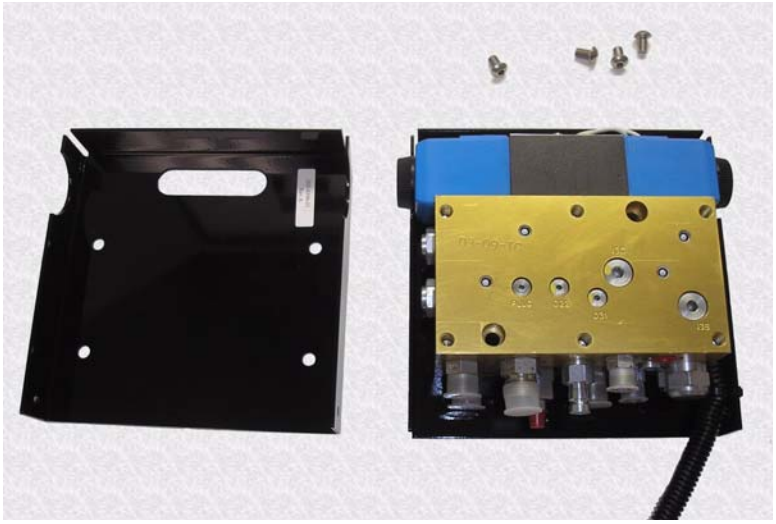
1. Place the Steering Valve on a flat surface. Remove the four cover screws with a 3/16” Allen wrench. See *Figure 2-3*.

Figure 2-3 Remove Front Panel Screws from Steering Valve

WARNING
HIGH PRESSURE FLUID HAZARD
• READ INSTRUCTION MANUAL BEFORE INSTALLING
• RELIEVE SYSTEM PRESSURE BEFORE SERVICING
• WEAR HAND AND EYE PROTECTION

2. Remove the front cover and screws and save them for the final reassembly after the Steering Valve has been installed on the vehicle. See *Figure 2-4*.

Figure 2-4 Front Cover Removed



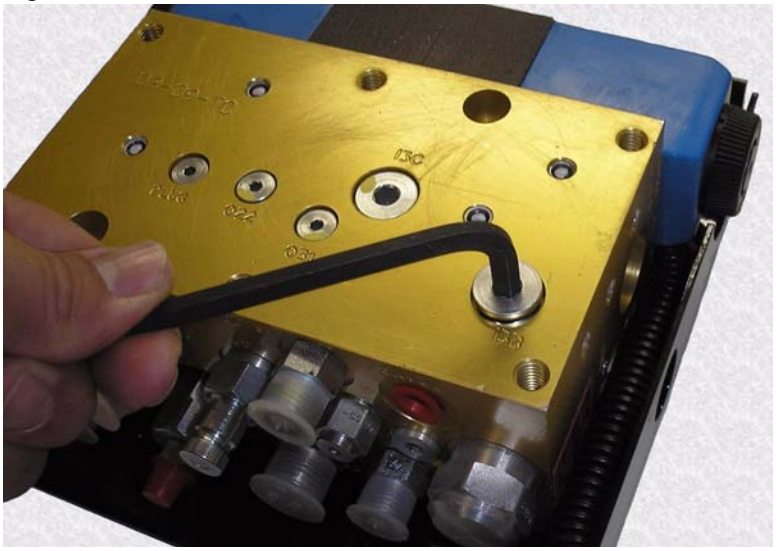
3. Locate the Plug stored in the parked position on the Steering Valve body and remove it with a 1/8” Allen wrench. See *Figure 2-5*.

Note: The plugs, orifices, and port access plugs are very tight. Loosening them could take a considerable amount of force. Verify that your tools are in good shape prior to attempting this procedure.

Figure 2-5 Remove Plug from Steering Valve Body

4. Locate the **13B** port on the Steering Valve and remove the access port with a 1/4” Allen wrench. See *Figure 2-6*.

Figure 2-6 Remove the 13B Access Port

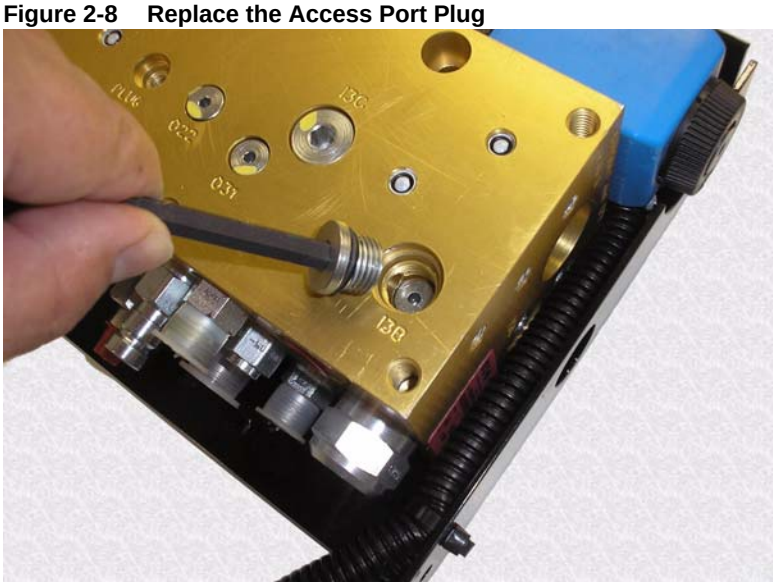


5. Install the Plug removed in *Step 3* into the bottom of port **13B** and tighten it with a 1/8” Allen wrench. See *Figure 2-7*.

Figure 2-7 Install the Plug into Port 13B

6. Replace the access port plug into Port **13B** and tighten with a 1/4” Allen wrench. See *Figure 2-8*. The Steering Valve is now ready to install on the vehicle.

Figure 2-8 Replace the Access Port Plug



Note: The plug in position 13A may need to be replaced with a 0.022" orifice if the vehicle’s hydraulic pump does not stroke down after the AutoSteer system disengages. Perform a verification of this function after installing the AutoSteer system. The optional 0.022" orifice works as a load sense bleed-down path for the AutoSteer load sense signal if the vehicle’s load sense bleed down does not work properly or does not exist.

Install the Steering Valve

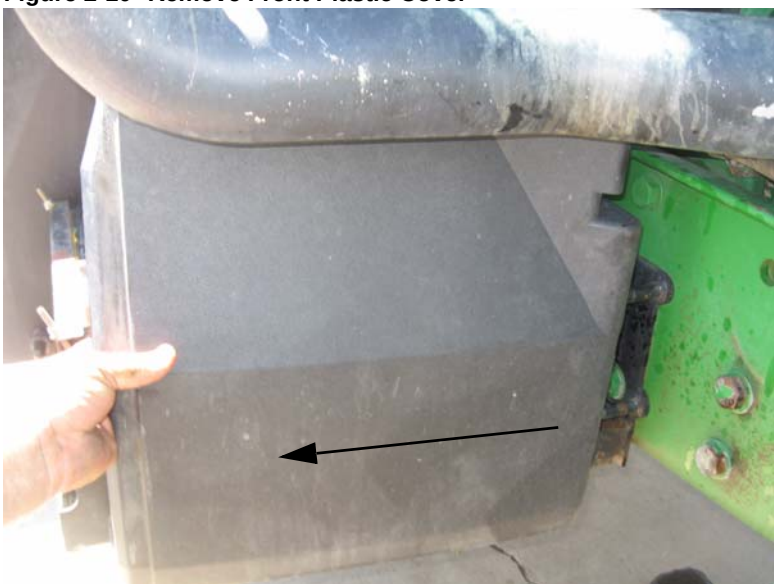
1. Remove the battery cover on the left side of the vehicle under the cab. See *Figure 2-9*.

Figure 2-9 Remove Battery Cover

2. Remove front plastic panel around battery compartment by pulling it away from the vehicle. See *Figure 2-10*.

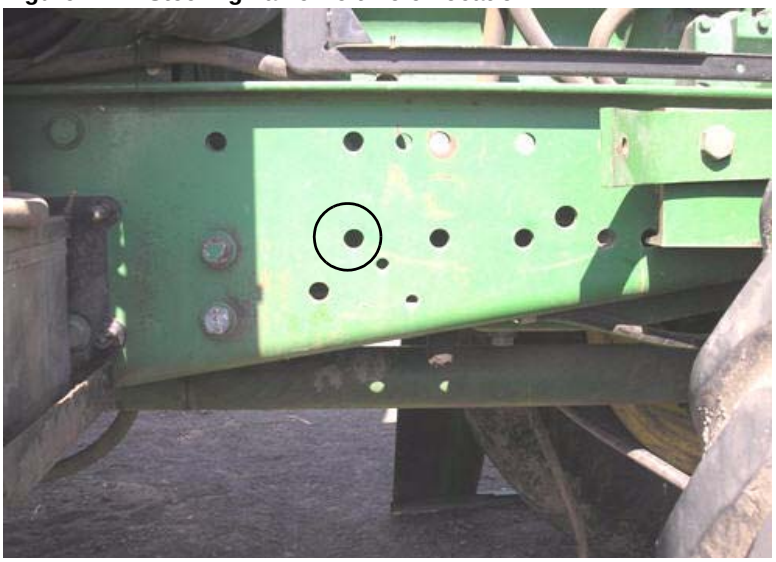
Note: On some vehicle models the battery cover is one piece.

Figure 2-10 Remove Front Plastic Cover



3. Locate the existing hole on the right side of the vehicle frame. See *Figure 2-11*.

Figure 2-11 Steering Valve Bolt Hole Location



4. Install a M12 x 50mm bolt and nut below the bracket as shown to prevent the bracket from rotating after it is installed. Tighten the bolt with 19 mm socket and ratchet and wrench.
5. Install the Steering Valve bracket using a long M20 x 60mm bolt, nut, and washer provided with the bracket installation kit.
6. Torque the bolts to 250 ft-lbs (340Nm) with a 30mm wrench and socket and ratchet. See *Figure 2-12*.

Figure 2-12 Steering Valve Bracket Mounted

7. Prepare the bolts on the back of the Steering Valve as shown in *Figure 2-13*. Start two of the mounting bolts for mounting the Steering Valve to the Steering Valve block. Do not tighten completely. Allow enough space for the bolt heads to slide into the slot on the bracket.

Note: The two bolts on the left can be tightened to hold the cover to the Steering Valve block firmly while installing. Prior to tightening the bolts, verify all the other holes on the cover will allow a bolt to screw in easily.

Figure 2-13 Install Bolts

8. Slide the Steering Valve into the slots on the Steering Valve bracket.
9. Secure the Steering Valve to the bracket with the other two mounting bolts.
10. Tighten all the bolts with a 1/2” ratchet wrench. The Steering Valve is now installed as shown in *Figure 2-14*.

Figure 2-14 Steering Valve Attached

Hydraulic Hose Overview

Steering Valve Port Overview

The Steering Valve has six ports that need to be connected to the vehicle. The ports are shown in *Figure 2-15* and the connection for each is described in *Table 2-2*.

Figure 2-15 Steering Valve Ports

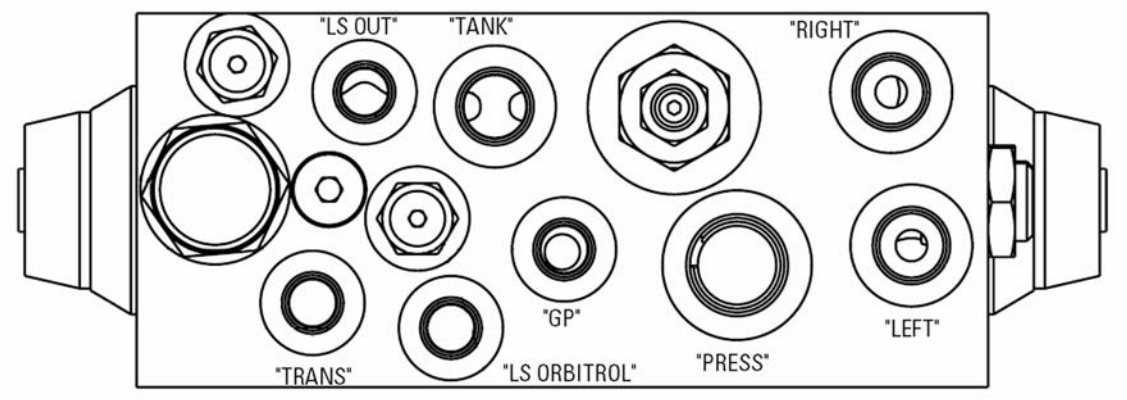


Table 2-2 Valve Functions and Fitting Sizes

Valve Label	Function	Fitting Type/Size
PRESS	Pressure (From Power Beyond)	-8 ORFS
TANK	Tank / Return (From Power Beyond)	-6 ORFS
LS ORBITROL	Load Sense From Orbitrol Line	-4 ORFS
LS OUT	Load Sense (From Power Beyond)	-4 ORFS
LEFT	Left Steering Cylinder	-6 ORFS
RIGHT	Right Steering Cylinder	-6 ORFS
GP	Diagnostics Port	1/8” Coupler Nipple (SAE J1502)
TRANS	Pressure Transducer	-4 SAE ORB

Hose Connection Overview

Figure 2-16 previews the hose connections. The PRESS, TANK, and LS OUT ports will be connected to the Power Beyond connections. The LS ORBITROL port will be connected to the Load Sense line that detects when the steering Orbitrol is enabled. The LEFT and RIGHT ports will be teed into the corresponding lines near the steering cylinders that cause the vehicle to turn left or right.

Table 2-3 shows the list of hoses provided by the installation kit. The kit also provides colored cable ties. To ensure the correct hose is attached to the correct port on both sides, attach the colored cable tie shown in the table to each end of the hose listed.

The numbers in *Figure 2-16* and *Table 2-3* correspond to the Item Numbers for each hose provided in *Hose Kit Components* on page 4. If the number has a "-#" after it, it means that there are multiple hoses with the same length and fittings.

Figure 2-16 Power Beyond Hydraulic Connection Diagram

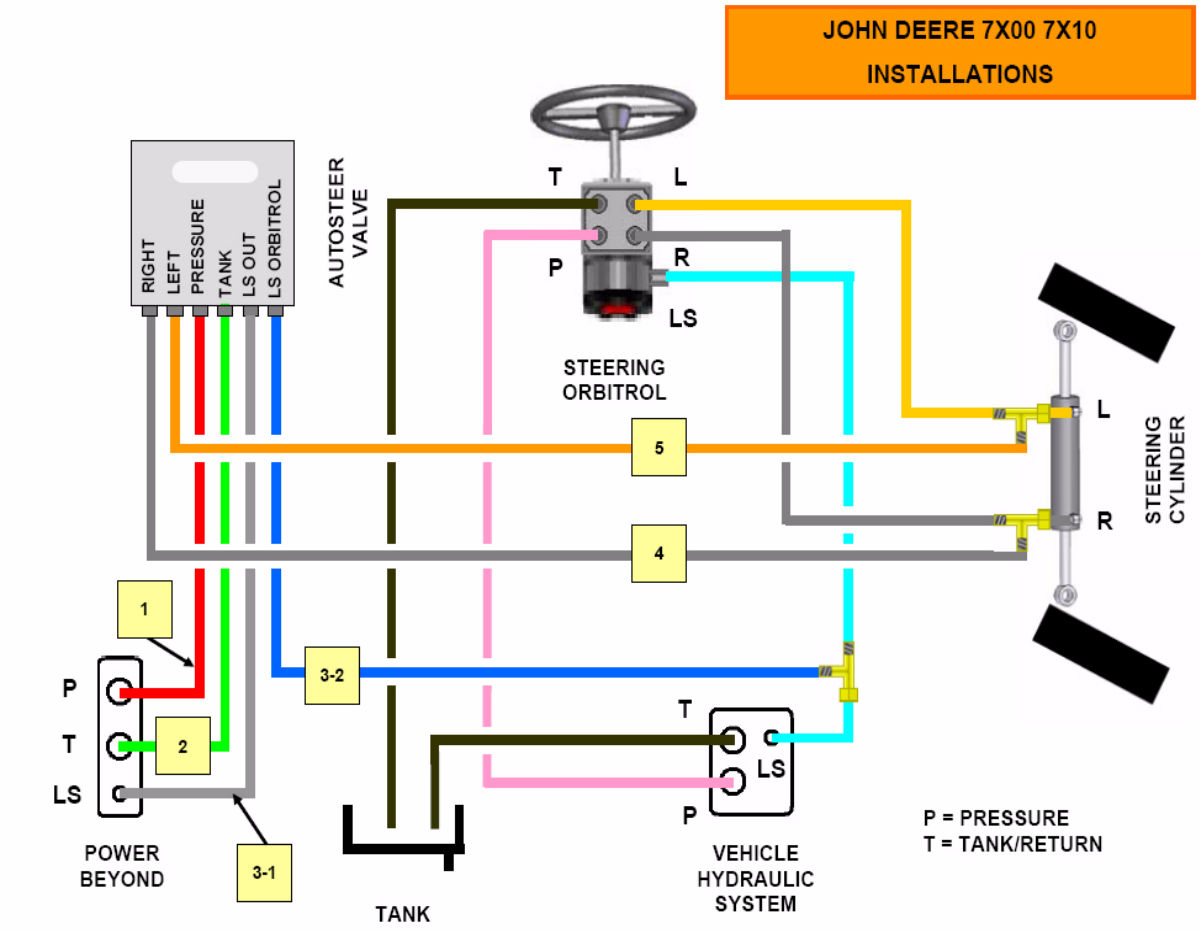


Table 2-3 Color Codes for Hydraulic Hoses

Valve Port Hose	Color	Item Number from Hose Kit	Notes
PRESSURE	Red	1	3/8" x 132" -8F ORFS x -8 ORFS
TANK	Green	2	3/8" x 132" -6F ORFS x -8 ORFS
LS ORIBITROL	Blue	3-2	1/4" x 126" -4F ORFS x -4 ORFS
LS OUT	Grey	3-2	1/4" x 126" -4F ORFS x -4 ORFS
RIGHT	Yellow	4	3/8" x 54" -6F ORFS x -8 ORFS 90 Deg
LEFT	Orange	5	3/8" x 66" -6F ORFS x -8 ORFS 90 Deg

Hose Connection Procedure

Note: Due to limited space in the Steering Valve port area, the hoses should be connected in the order provided by this installation manual to reduce installation problems. Refer to the hose diagram in *Figure 2-16* and *Table 2-3* for information on connecting the correct hydraulic hose to the correct ports on the vehicle and Steering Valve.

Power Beyond and Orbitrol LS Hydraulic Connections

1. Locate the two shields on the back of the vehicle. See *Figure 2-17*.

Figure 2-17 Rear Shields

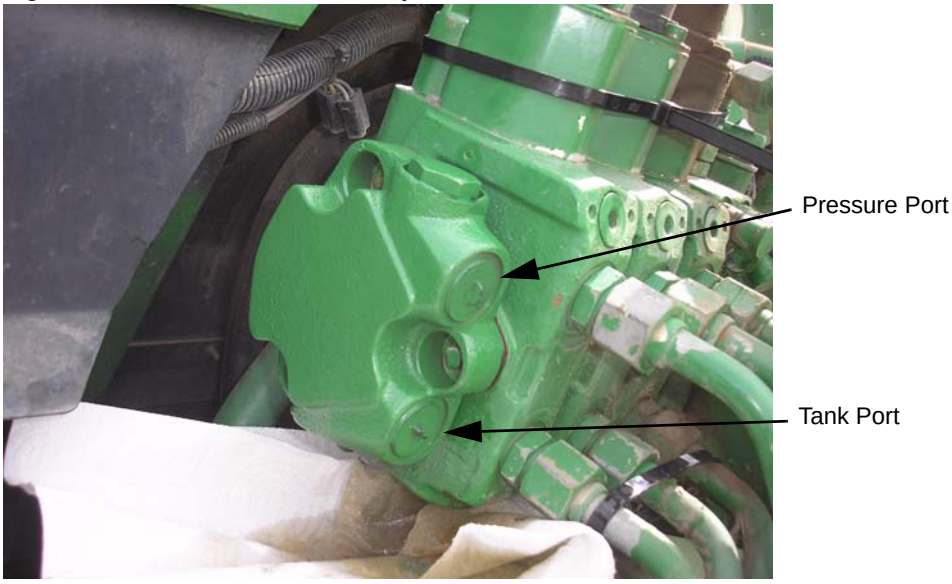
2. Remove both shields by removing the two bolts attaching each shield to the fender walls with a 13mm socket and ratchet and a 13mm wrench.

Note: The bolts that hold the left shield on are shown in *Figure 2-18*. The right shield is held with bolts on the opposite side.

Figure 2-18 Bolts on Rear Shields

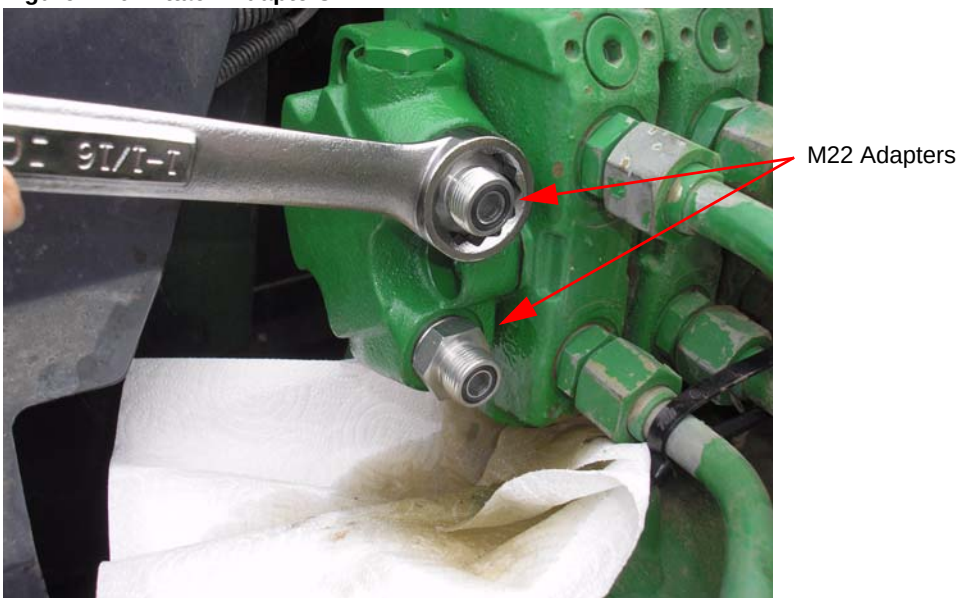
3. Locate the Pressure and Return/Tank ports on the back of the Power Beyond plate.
4. Remove the plastic protective caps shown in *Figure 2-19* with a pliers or flat screwdriver.

Figure 2-19 Remove Protective Caps for Pressure and Tank Ports



5. Attach the two M22 Adapters to the ports.
6. Tighten the adapters shown in *Figure 2-20* with a 1-1/16” wrench.

Figure 2-20 Attach Adapters



7. Locate the Load Sense port on the bottom of the Power Beyond plate shown in *Figure 2-21*.
8. Remove the plastic plug with flat screwdriver or pliers.

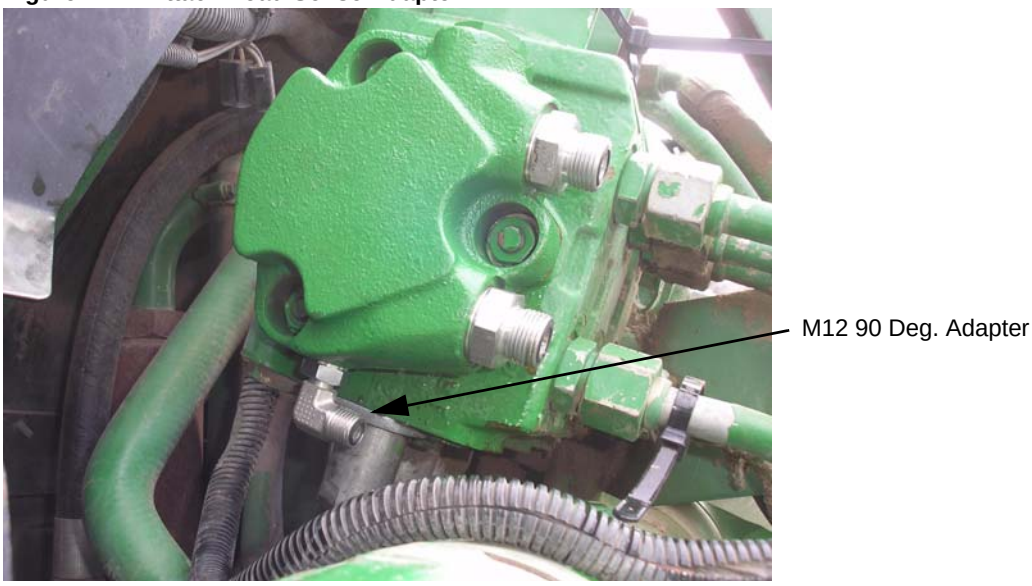
Figure 2-21 Load Sense Port

9. Attach the M12 90 Deg. Adapter to the port.

10. Tighten the adapter with a 17mm wrench so the port is pointing backwards as shown in *Figure 2-22*.

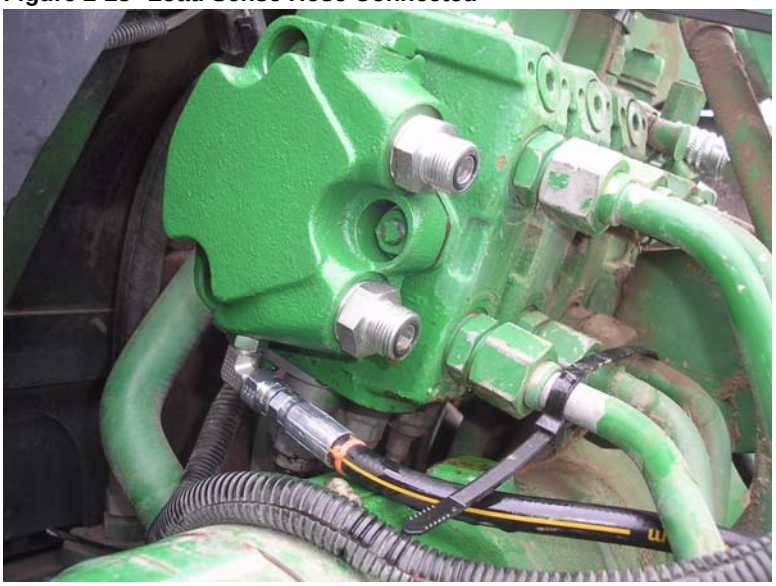
Note: The Load Sense port for the Power Beyond can sometimes be located in a different position depending on the exact vehicle model and year. An additional M14 hose adapter is provided in the hose kit to account for this possibility. Use this adapter only if it is needed.

Figure 2-22 Attach Load Sense Adapter



11. Connect one of the Load Sense Out hose to the Load Sense port on the Power Beyond. Tighten the hose with an 11/16” wrench. See *Figure 2-23*.

Figure 2-23 Load Sense Hose Connected



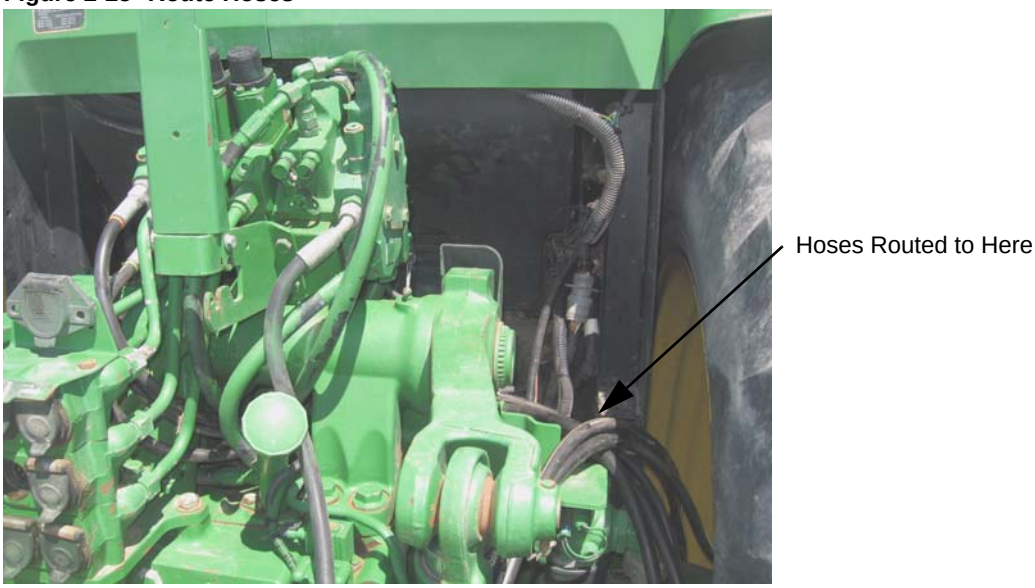
12. Connect the Pressure and Return/Tank hoses to the Pressure and Return/Tank ports on the Power Beyond. Tighten the hoses with a 15/16” wrench. See *Figure 2-24*.

Note: The Pressure hose has a #8 ORFS hose connection on both ends. The Return/Tank hose has one #8 ORFS and one #6 ORFS connector.

Figure 2-24 Pressure and Return/Tank Port Hoses Connected

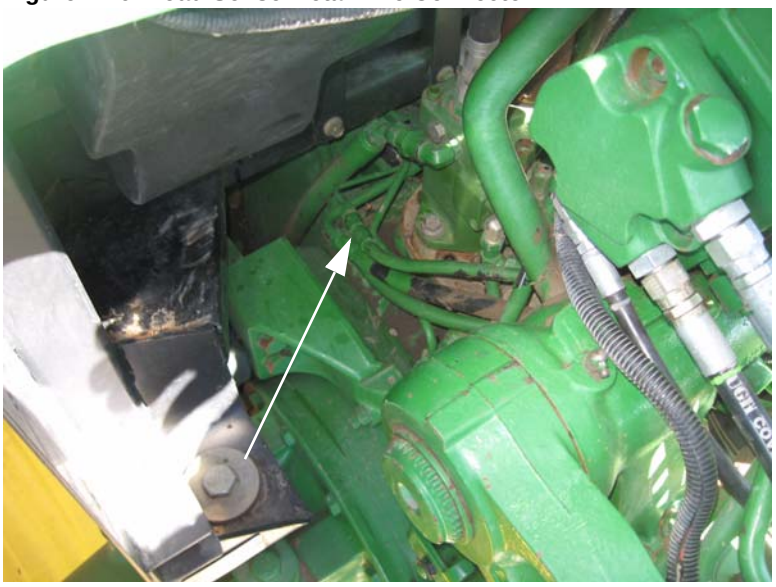
13. Route the three hoses down and under the existing hoses, three-point lift pivot point, and then over to the right side of the cab. See *Figure 2-25*.

Figure 2-25 Route Hoses



14. Locate where the Orbitrol Load Sense metal line connects to the rubber hose near the left, rear cab support in the back of the vehicle. See *Figure 2-26*.

Figure 2-26 Load Sense Metal Line Connector



15. Separate the hose from the steel line with two 11/16” wrenches. See *Figure 2-27*.

Figure 2-27 Split Line

16. Attach the -4 ORFS Run Tee to the steel line. See *Figure 2-28*.

Figure 2-28 Attach Run Tee

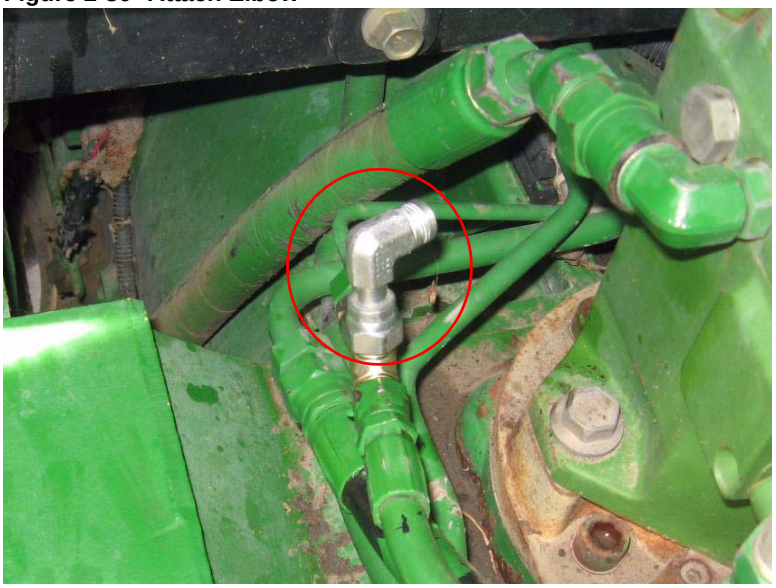
17. Reattach the rubber hose to the end of the -4 ORFS Run Tee as shown in *Figure 2-29*.

Figure 2-29 Connect Hose

18. Attach a -4 ORFS 90 Deg. Elbow to the open port on the -4 ORFS Run Tee.

Note: Have the port point towards the right side of the vehicle as shown in *Figure 2-30*.

Figure 2-30 Attach Elbow



19. Attach the Load Sense Orbitrol hose to the -4 ORFS 90 Deg. Elbow as shown in *Figure 2-31*.

20. Tighten all connections with 11/16” wrenches.

21. Route the hose to the right side of the tractor where the other three hoses are.

Figure 2-31 Route Hose

Attach Hoses from Power Beyond and LS Orbitrol Ports to the Steering Valve

1. Route the four hoses towards the Steering Valve along the “U” channel below the right side of the cab shown in *Figure 2-32*.

Figure 2-32 Route Hoses

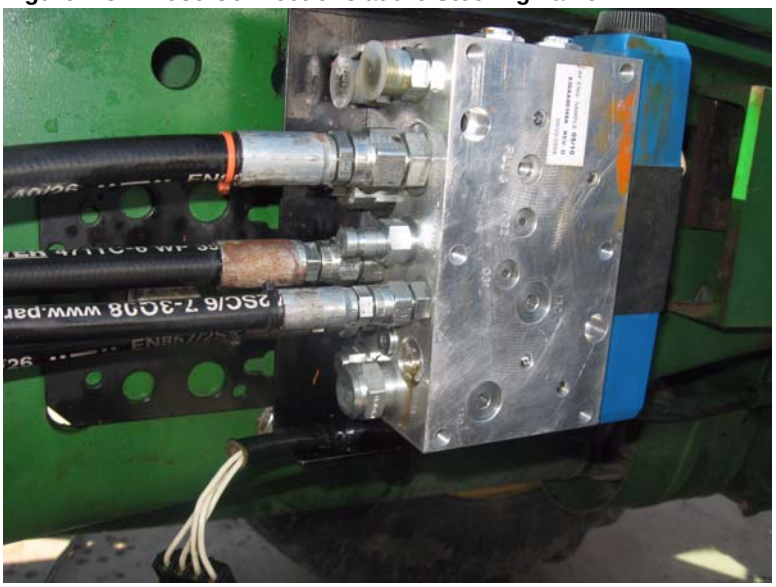
2. Route the hoses out under the exhaust below the front, right side of the cab shown in *Figure 2-33*.

Note: Ensure that the hoses will not come in contact with the exhaust after the installation is complete.

Figure 2-33 Route Hoses

3. Attach the hose from the Power Beyond Load Sense port on the back of the vehicle to the **LS OUT** port of the Steering Valve. Tighten with an 11/16” wrench.
4. Attach the hose from the Power Beyond Return/Tank port on the back of the vehicle to the **TANK** port on the Steering Valve. Tighten with a 13/16” wrench.
5. Attach the hose from the Orbitrol Load Sense Tee on the back of the vehicle to the **LS ORBITROL** port on the Steering Valve. Tighten with an 11/16” wrench
6. Attach the hose from Power Beyond Pressure port on the back of the vehicle to the **PRESS** port on the Steering Valve. Tighten with a 15/16” wrench. See *Figure 2-34* for an example of the final assembly.

Figure 2-34 Hose Connections at the Steering Valve



Steering Line Hose Connection

1. Locate the hose connector on the steering cylinder that when pressurized, pushes the cylinder so the vehicle turns to the right. See *Figure 2-35*.

Note: There are multiple types of front axles available for this series of vehicles. These instructions only show the attachment of the hoses for one type. Modify the installation procedure as needed if installing on an alternative front end.

Figure 2-35 Locate Right Steer Line

2. Disconnect the hose from the steering cylinder with a 15/16” wrench. See *Figure 2-36*.

Figure 2-36 Disconnect Hose

3. Attach a -8 ORFS Run Tee to the cylinder.
4. Reattach the steering hose to the -8 ORFS Run Tee.

Note: Point the Run Tee downwards.

---

5. Attach the 90 degree angle of the right steer hose to the open port on the -8 ORFS Run Tee.
6. Tighten all fittings with a 15/16” wrench. The final assembly is shown in *Figure 2-37*.

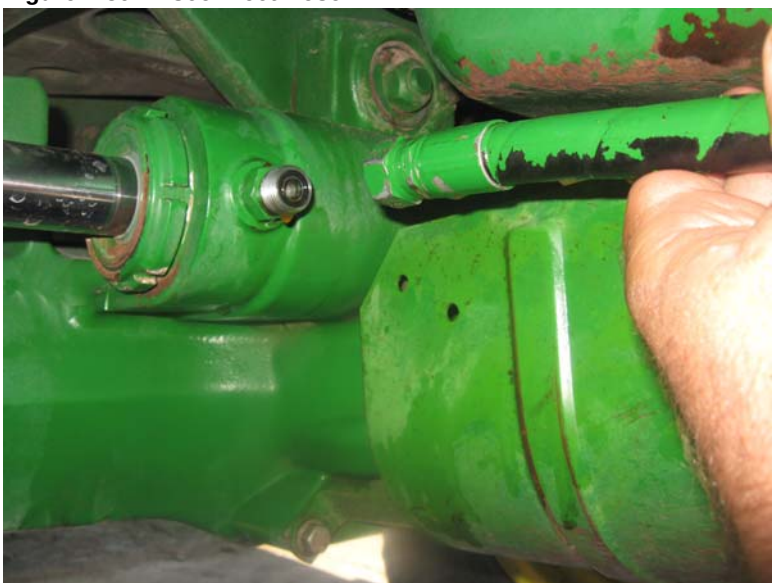
Figure 2-37 Reattach Right Steer Line

7. Locate the hose connector on the steering cylinder that when pressurized, pushes the cylinder so the vehicle turns to the left. See *Figure 2-38*.

Figure 2-38 Locate Left Steer Line

8. Disconnect the hose from the steering cylinder with a 15/16” wrench. See *Figure 2-39*.

Figure 2-39 Disconnect Hose



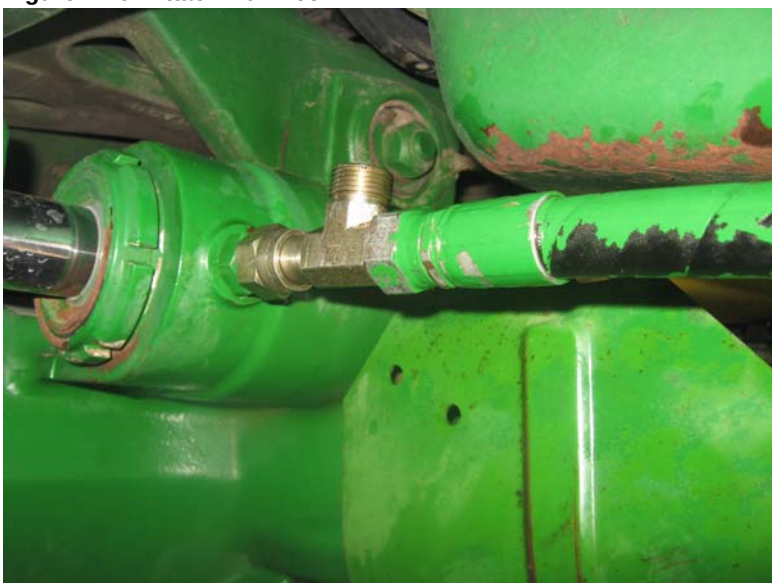
9. Attach a -8 ORFS Run Tee to the cylinder.

Note: Point the Run Tee upwards.

---

10. Reattach the steering hose to the -8 ORFS Run Tee as shown in *Figure 2-40*.

Figure 2-40 Attach Run Tee

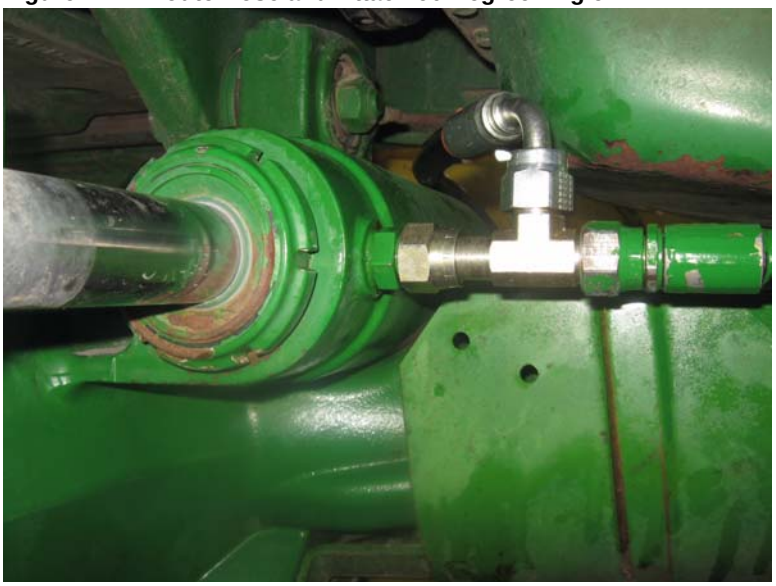


11. Route the hose to the right side of the vehicle over the top of the drive shaft.

12. Attach the 90 degree angle of the left steer hose to the open port on the -8 ORFS Run Tee.

Note: When tightening the hose, verify the hose points towards the front of the vehicle so it is not damaged when the axle pivots up and down in uneven ground as shown in *Figure 2-41*.

Figure 2-41 Route Hose and Attach 90 Degree Angle



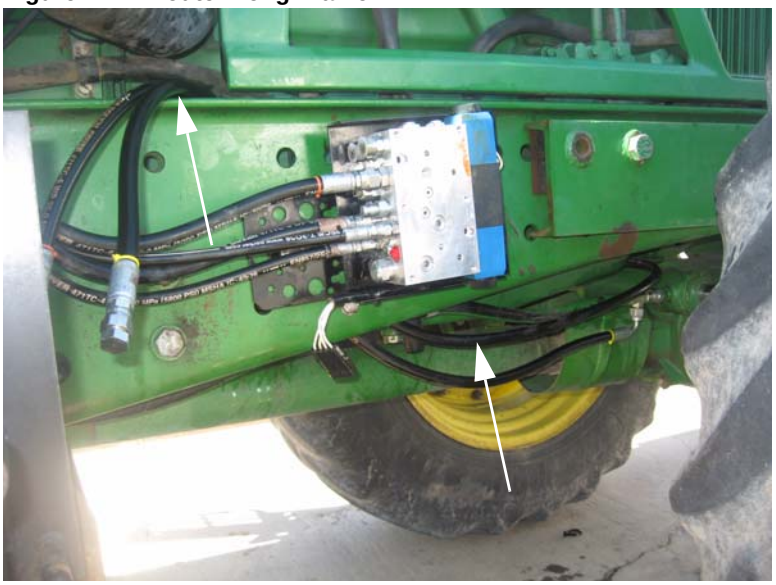
13. Tighten all fittings with a 15/16” wrench.

14. Route both hoses along the existing right steer line up between the frame and the engine.

15. Route the hoses out over the top of the frame and back towards the Steering Valve. See *Figure 2-42*.

Note: Verify that the hoses are routed in a safe location so that they do not get caught in the drive shaft, get damaged by tall crops, or touch the exhaust line.

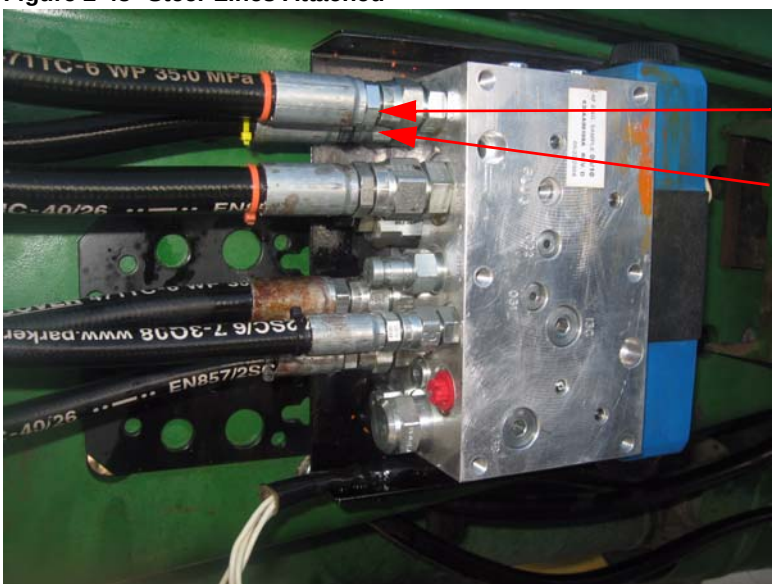
Figure 2-42 Route Along Frame



16. Attach the Steer Right hose to the RIGHT port on the Steering Valve. Tighten the hose connection with a 13/16” wrench. See *Figure 2-43*.

17. Attach the Steer Left hose to the LEFT port on the Steering Valve. Tighten the hose connection with a 13/16” wrench. See *Figure 2-43*.

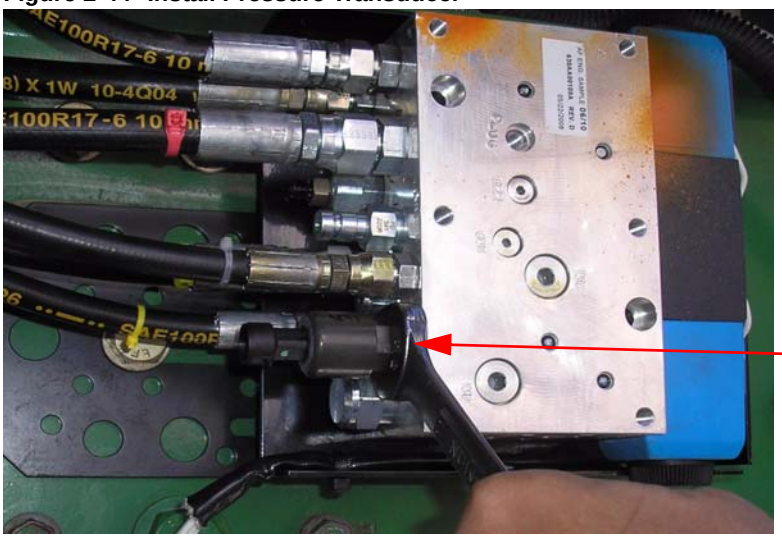
Figure 2-43 Steer Lines Attached



Connect Pressure Transducer

1. Remove the plug from the TRANS port and attach the Pressure Transducer. Tighten the Pressure Transducer with a 3/4” wrench as shown in *Figure 2-44*.

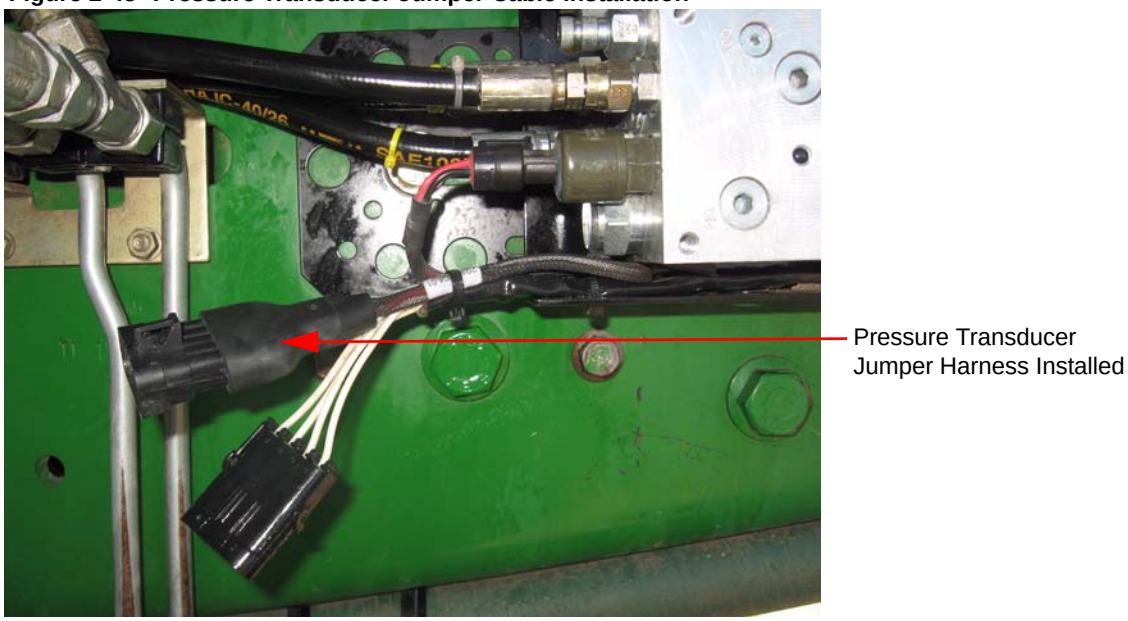
Figure 2-44 Install Pressure Transducer



Note: Do not over tighten the Pressure Transducer.

2. Attach the Pressure Transducer Jumper Harness to the Pressure Transducer.
3. Coil the excess harness between the Steering Valve and the outer cover; secure this with a cable tie. Cable tie the 4-pin and 10-pin connector together. See *Figure 2-45*.

Figure 2-45 Pressure Transducer Jumper Cable Installation



Pressure Relief Valve Adjustment

The Steering Valve has a built-in Load Sense Pressure Relief Valve that limits the maximum pump pressure when using the AutoSteer system. The Pressure Relief Valve must be adjusted after the entire AutoSteer system has been installed and the system has been checked for hydraulic leaks. The Display, Roof Module, and all harnesses must be connected prior to performing this procedure.

This procedure is provided in the *Post Installation Procedures and Information* chapter after the rest of the installation has been completed. Do not forget to set the Pressure Relief Valve or system damage could occur.

Steering Valve Installation Checklist

1. Valve Bracket bolt is tight.
2. Mounting bolts that secure the Steering Valve are tight.
3. Pressure Hose is connected to correct port on Steering Valve and Power Beyond Pressure port.
4. Tank/Return Hose connected to correct port on Steering Valve and Power Beyond Return/Tank port.
5. LS-OUT hose connected to correct port on Steering Valve and Power Beyond Load Sense port.
6. LS ORBITROL hose connected to correct port on the Steering Valve and to the Orbitrol Load Sense line.
7. Right Steer Hose connected to the correct port on the Steering Valve and to the Steer Right line at the front axle.
8. Left Steer Hose connected to the correct port on the Steering Valve and to the Steer Left line at the front axle.
9. Pressure Transducer installed and tight.
10. All other hose fittings are tight.
11. Checked that all hoses and cables have been routed so they will not be damaged by moving parts of foreign objects.
12. After the entire system has been installed, follow the Hydraulic Leak Test procedure in *Post-Installation Procedures and Information* chapter.

Wheel Angle Sensor (WAS) Installation

The **Wheel Angle Sensor Installation** chapter information is provided in the following sections:

- *Wheel Angle Sensor Overview*
- *Identify the Front Axle Option*
- *Wheel Angle Sensor Installation Procedure*
  - *Mount the Brackets for Option 1*
  - *Mount the Brackets for Option 2*
  - *Mount the Brackets for Option 3 and 4*
  - *Cut the Wheel Angle Sensor Rods*
  - *Assemble the Linkage Rod Hardware*
  - *Attach Wheel Angle Sensor Rods to Brackets and Adjust*

Note: The Wheel Angle Sensor is optional equipment and is not provided with the installation kit. The Wheel Angle Sensor installation instructions are provided for special installations, when required.

If additional on-line performance is required, a Wheel Angle Sensor is available for this vehicle. The decision to use this option are left up to the installer and customer.

Wheel Angle Sensor Overview

In order to add a Wheel Angle Sensor to this vehicle, additional parts are required. Contact your AutoSteer dealer to get the current part numbers and to order them if this accessory is desired. *Table 3-1* provides the current parts that are required as a reference.

Table 3-1 John Deere 7X00/7X10 Wheel Angle Sensor Kit Component Part Numbers

Item	Component	Part Number
1.	Wheel Angle Sensor Assembly Kit	200-0468-01
2.	JD-7X00 7X10 Wheel Angle Sensor Brackets	200-0476-01

The JD-7X00 7X10 Wheel Angle Sensor Bracket Kit provides brackets for multiple vehicle front axles. The brackets used will differ based on the front end. *Figure 3-1* provides a picture of the various brackets and *Table 3-2* provides information as to which installation the bracket parts are used for. Not all brackets will be used for all installations. Use only the brackets that are called out for the specific axle type installation.

Figure 3-1 JD 7X00/7X10 Wheel Angle Sensor Kit Components

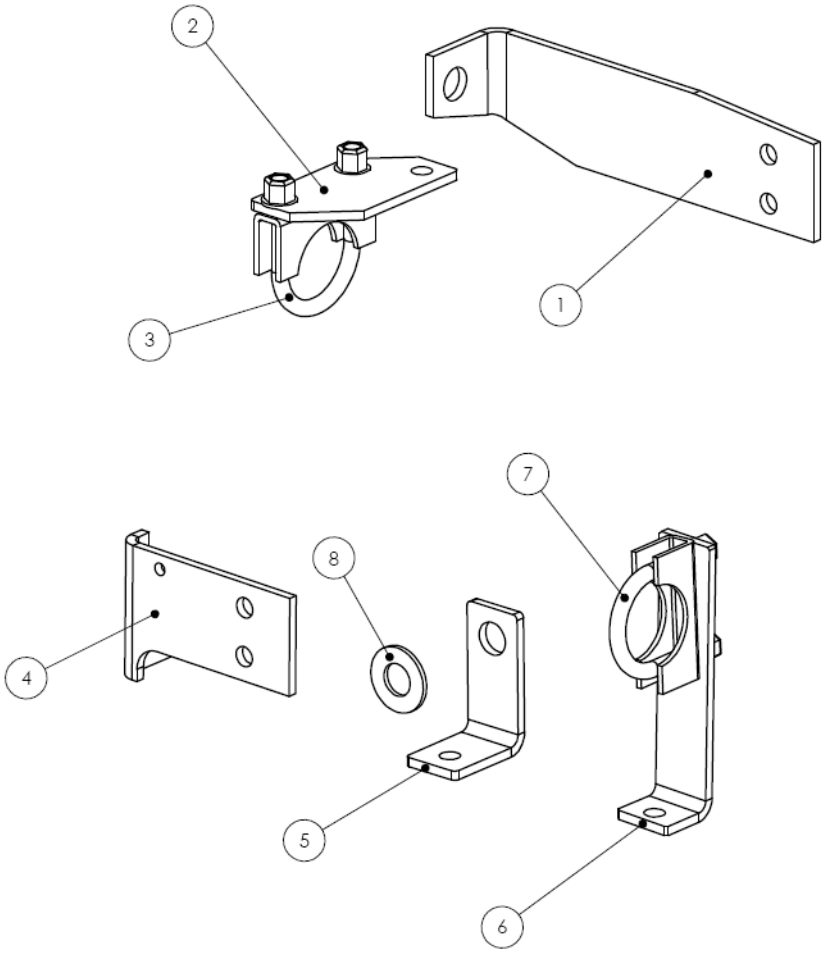


Table 3-2 JD 7X00/7X10 Wheel Angle Sensor Kit Components

Item	Component	Part Number	Axle Type Used On
1.	Wheel Angle Sensor Bracket	202-0052-01	Dual Cylinder
2.	Linkage Rod Bracket	202-0053-01	Dual Cylinder
3.	Linkage Rod Clamp	200-0099-01	Dual Cylinder
4.	Wheel Angle Sensor Bracket	202-0054-01	Single Cylinder Light & Heavy Duty
5.	Linkage Rod Bracket	202-0055-01	Single Cylinder Heavy Duty
6.	Linkage Rod Bracket	202-0139-01	Single Cylinder Light Duty
7.	Linkage Rod Clamp	200-0106-01	Single Cylinder Light Duty
8.	Washer	516-0010-01	Single Cylinder Heavy Duty

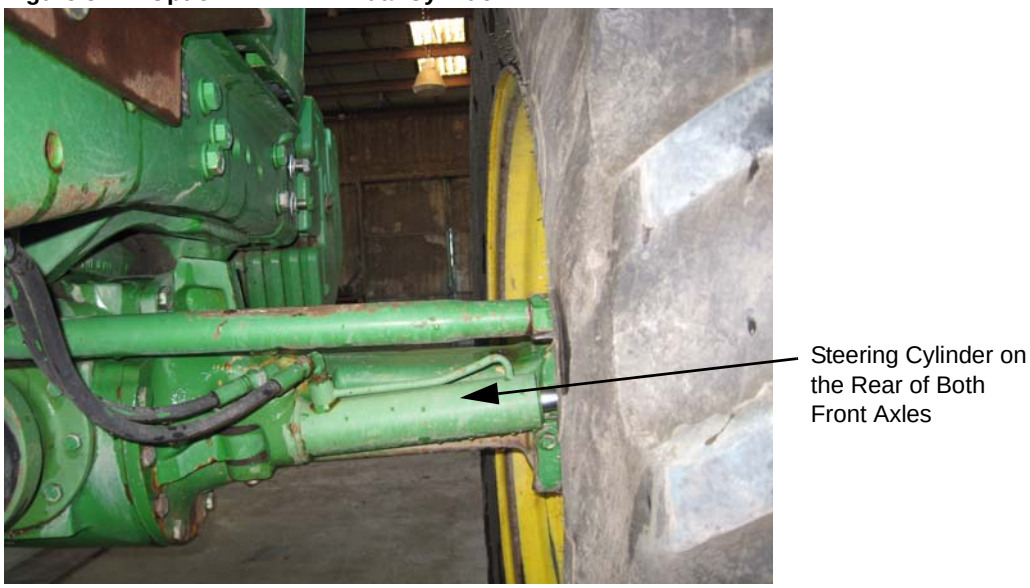
Identify the Front Axle Option

There is the possibility of multiple versions of front axles on these models of vehicles; however the Wheel Angle Sensor kit will work with all of them. The first step is to identify the axle that is present on the vehicle the installation is being performed on. The four main axle types are explained below and the specific features and expected models are provided. Follow the instructions given for the axle type for the installation being installed on. Keep in mind it is possible for variations to these four options to exist. Use the expected models information as a guide only.

Option 1 - MFWD Dual Cylinder

This installation is expected on all 7200, 7400, 7600, 7700, 7800 models. It is also possible for it to be on early 7210, 7410, 7510, 7610, 7710, and 7810 models. It is easy to identify as it has a separate steering cylinder on both axles. See *Figure 3-2*.

Figure 3-2 Option 1 - MFWD Dual Cylinder



Option 2 - MFWD Single Cylinder Light Duty

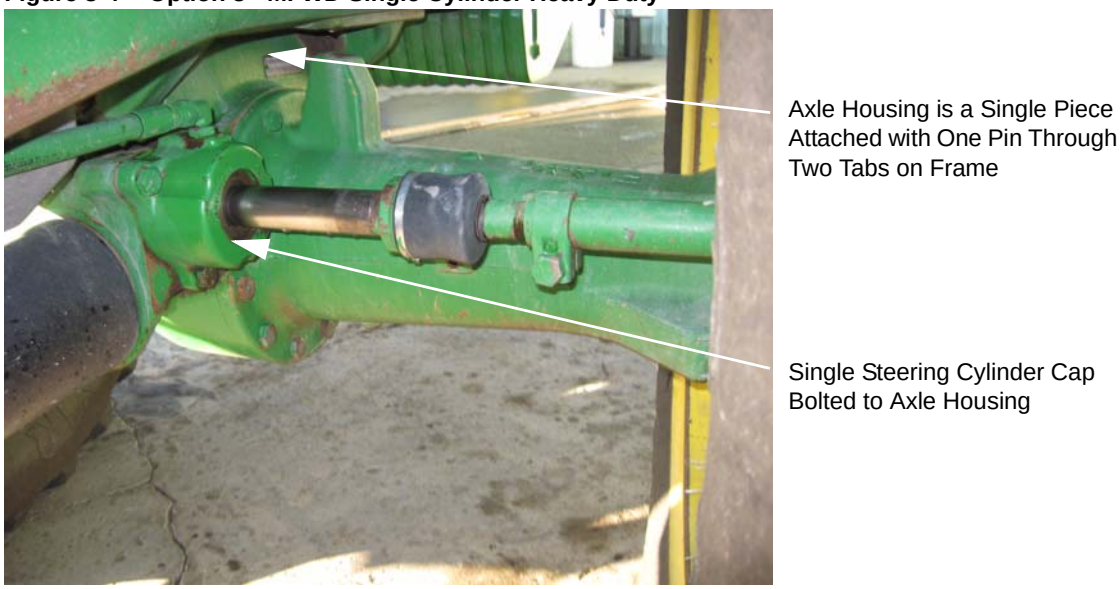
This installation can be expected on some 7210, 7410, and 7510 models. It is identifiable by having one steering cylinder built into the rear of the front axle housing. The hydraulic hoses connect to the back of the left and right side of the steering cylinder. The front axle is attached to the vehicle frame by two pins and two tabs on the axle and frame. See *Figure 3-3*.

Figure 3-3 Option 2 - MFWD Single Cylinder Light Duty

Option 3 - MFWD Single Cylinder Heavy Duty

This installation can be expected on 7210, 7410, 7510, 7610, 7710 and 7810 models. It is identifiable by having one steering cylinder bolted into the rear of the front axle housing. The hydraulic hoses connect to the cylinder on top of both sides. The front axle is attached to the frame by one long pin and two tabs from the frame. See *Figure 3-4*.

Figure 3-4 Option 3 - MFWD Single Cylinder Heavy Duty


Axle Housing is a Single Piece
Attached with One Pin Through
Two Tabs on Frame
Single Steering Cylinder Cap
Bolted to Axle Housing

Option 4 - Triple Link Suspension

This installation can be expected on 7610, 7710, and 7810 models. It is identifiable by having a flexible mounting point on the front of the axle to the frame. There are also chain links readily visible from the front. The installation instructions will be very similar to Option 3 - MFWD Single Cylinder Heavy Duty and will not be described as a separate installation. See *Figure 3-5*.

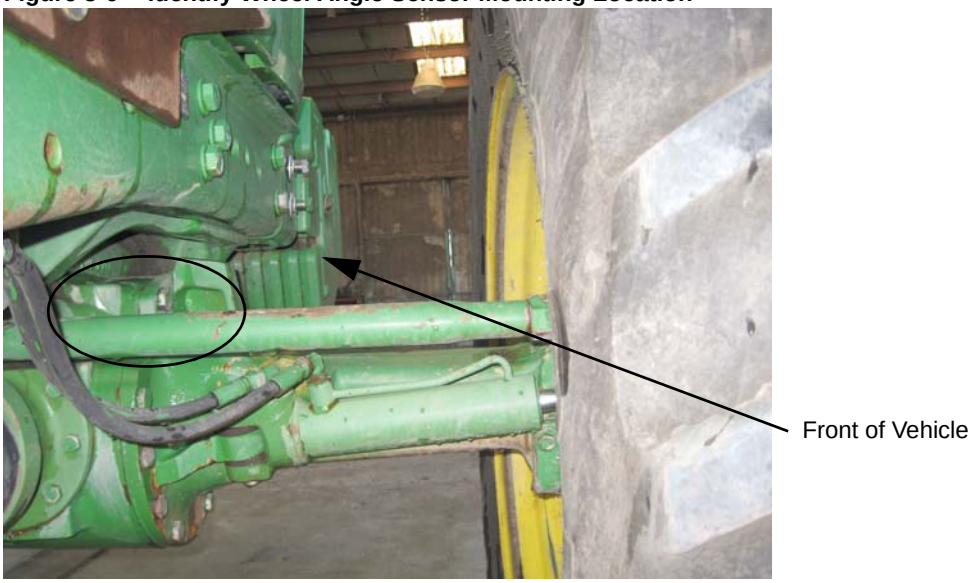
Figure 3-5 Option 4 - MFWD Triple Link Suspension

Wheel Angle Sensor Installation Procedure

Mount the Brackets for Option 1

1. Identify the Wheel Angle Sensor mounting location on the front right steering axle. See *Figure 3-6*.

Figure 3-6 Identify Wheel Angle Sensor Mounting Location



2. Remove the bolt on the steering axle case with a 24 mm socket and ratchet. See *Figure 3-7*.

Note: A breaker bar may be necessary to loosen this bolt.

Figure 3-7 Remove Bolt on Steering Axle Case

3. Attach the Wheel Angle Sensor bracket as shown with the existing bolt. Retighten the bolt so that the bracket that attaches to the Wheel Angle Sensor is perpendicular to the ground. See *Figure 3-8*.

Figure 3-8 Attach Wheel Angle Sensor Bracket

4. Attach Wheel Angle Sensor to the bracket. Tighten bolts with a 9/16” socket and ratchet. See *Figure 3-9*.

Figure 3-9 Attach Wheel Angle Sensor

5. Attach the linkage bracket to the tie rod on the front axle with the U-bolt provided.

Note: The bracket should be spaced so it is approximately 16-1/4 inches (413 mm) from edge of the nut on the end of the tie rod as shown in *Figure 3-10*.

---

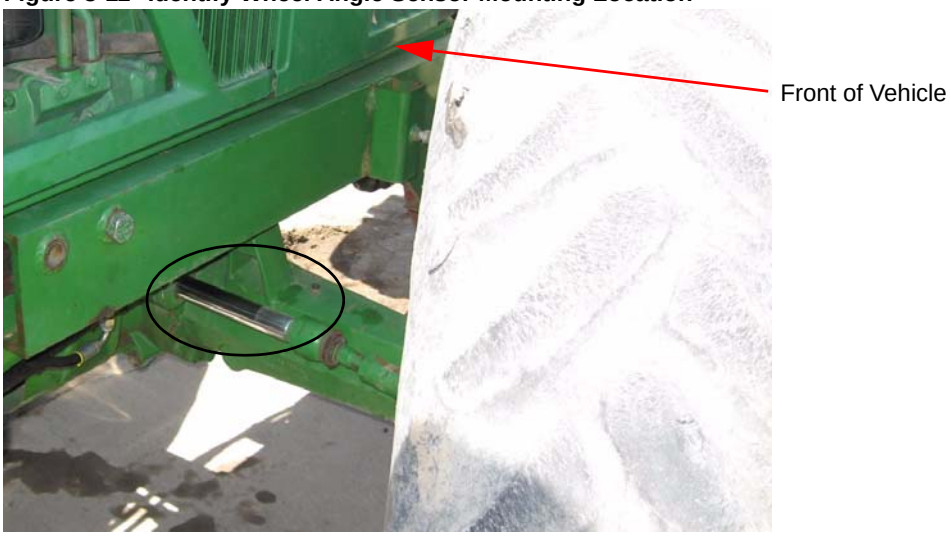
6. Tighten the linkage clamps with a 1/2" socket and ratchet so that the bracket is parallel with the ground.

Figure 3-10 Attach Linkage Bracket

Mount the Brackets for Option 2

1. Identify the Wheel Angle Sensor mounting location on the front right steering axle. See *Figure 3-11*.

Figure 3-11 Identify Wheel Angle Sensor Mounting Location



2. Remove the top bolt on the steering axle case with a 24mm socket and ratchet. See *Figure 3-12*.

Note: A breaker bar may be necessary to loosen this bolt.

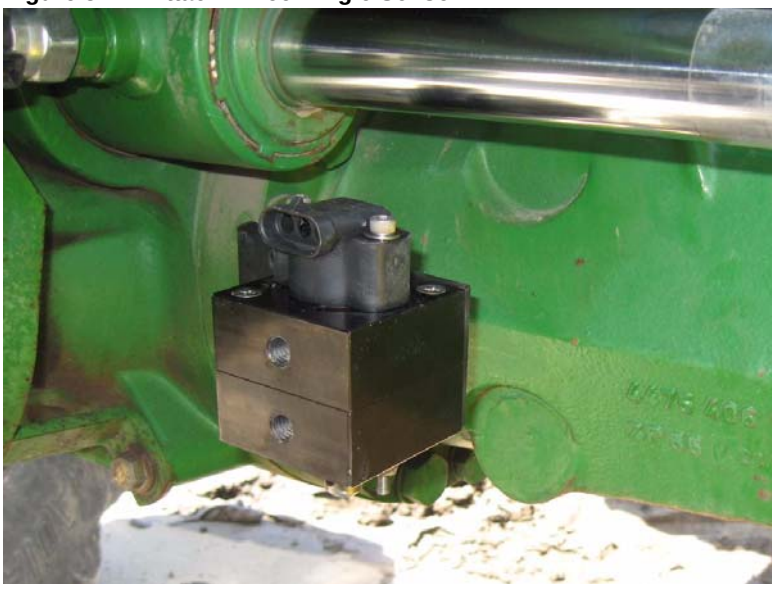
Figure 3-12 Remove Top Bolt on Steering Axle Case

3. Attach the Wheel Angle Sensor bracket as shown with the existing bolt. Retighten the bolt so that the bracket is perpendicular to the ground. See *Figure 3-13*.

Figure 3-13 Attach Wheel Angle Sensor Bracket

4. Attach Wheel Angle Sensor to the back of bracket. See *Figure 3-14*. Tighten bolts with a 9/16” socket and ratchet.

Figure 3-14 Attach Wheel Angle Sensor



5. Attach the linkage bracket to the tie rod on the front axle.

Note: The bracket should be spaced so it is approximately 4" (102 mm) from the rubber molding as shown in *Figure 3-15*.

Figure 3-15 Attach Linkage Bracket

6. Tighten the linkage clamps with a 1/2” socket and ratchet.

Note: The L bracket should be attached to the back of the tie rod in this installation.

Mount the Brackets for Option 3 and 4

1. Identify the Wheel Angle Sensor mounting location on the front right steering axle. See *Figure 3-16*.

Figure 3-16 Identify Wheel Angle Sensor Mounting Location

2. Remove the bolt on the steering axle case with a 24 mm socket and ratchet. See *Figure 3-17*.

Note: A breaker bar may be necessary to loosen this bolt.

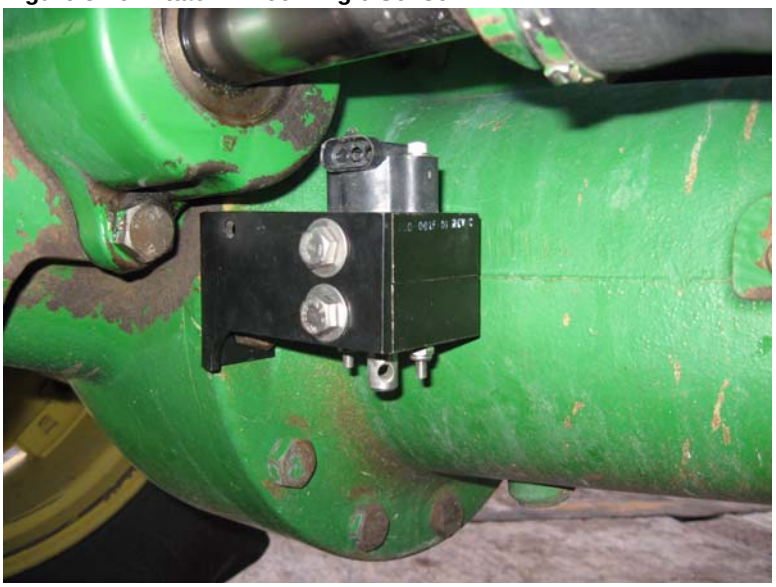
Figure 3-17 Remove Bolt on Steering Axle Case

3. Attach the Wheel Angle Sensor bracket as shown with the existing bolt. Retighten the bolt so that the bracket where the Wheel Angle Sensor is attached is perpendicular to the ground. See *Figure 3-18*.

Figure 3-18 Attach Wheel Angle Sensor Bracket

4. Attach Wheel Angle Sensor to the front of bracket. See *Figure 3-19*. Tighten bolts with a 9/16” socket and ratchet.

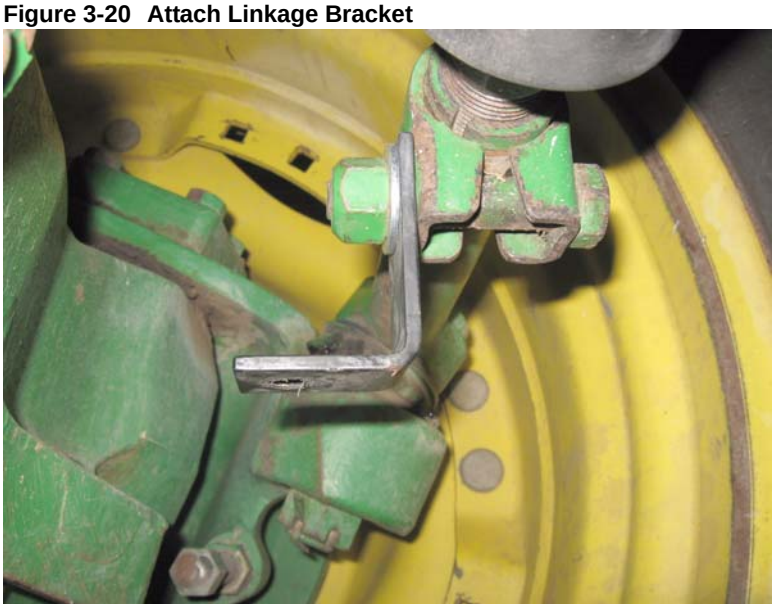
Figure 3-19 Attach Wheel Angle Sensor



5. Remove the nut on the tie rod clamp with a 24 mm socket and ratchet and wrench.
6. Attach the linkage bracket to the tie rod clamp. See *Figure 3-20*.

Note: The bracket should be the tie rod’s front side so the “L” part of the bracket faces the front of the machine.

Figure 3-20 Attach Linkage Bracket



7. Reattach the tie rod clamp nut and tighten securely.

Cut the Wheel Angle Sensor Rods

The Wheel Angle Sensor rods are shipped longer than they need to be. These rods must be cut to the proper length to allow the linkage rods to provide the Wheel Angle Sensor the maximum number of counts as the steering wheel is turned from full right to full left. Due to the variability of the possible mounting positions and axle options, it is the responsibility of the installer to verify the lengths provided in *Table 3-3* are correct for each individual installation prior to cutting the rods.

Table 3-3 provides the typical rod lengths that work for most installations. Before cutting the linkage rods to these measurements, verify that the Wheel Angle Sensor brackets has been attached to the vehicle as shown in this manual and that they are attached the correct distance from any reference points shown. If the axle does not allow the Wheel Angle Sensor brackets to be installed as shown, do not cut the rods until it is determined what the proper lengths are for your installation.

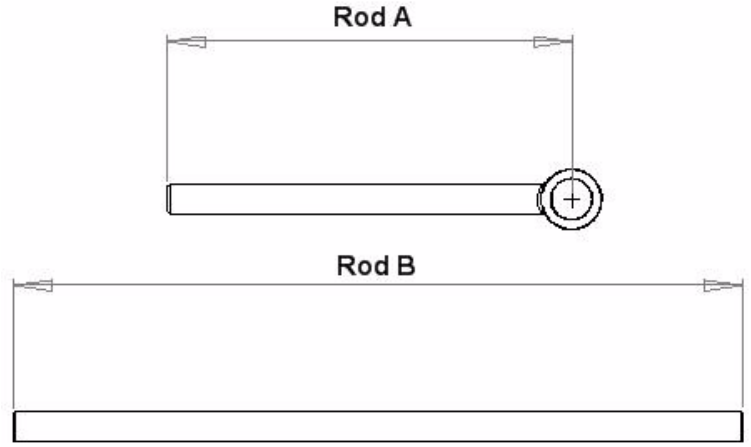
Even if the brackets can be attached as shown, these measurements may need to be slightly different to take into account minor installation differences. These measurements are provided as a reference only. The installer is responsible for verifying that the provided measurements will work prior to cutting the rods.

The lengths of the rods are different depending on which axle type the Wheel Angle Sensor is installed on. *Table 3-3* shows the expected lengths of the rods for mounting for each axle type. Refer to *Figure 3-21* to determine where the measurement points on the rods are taken to get the values provided in *Table 3-3*.

Table 3-3 Wheel Angle Sensor Rod Lengths

Rod ID	Option 1	Option 2	Option 3 Option 4
Rod A	2-1/4 in (57 mm)	3 in (76 mm)	4-1/2 in (114 mm)
Rod B	5-1/2 in (140 mm)	8-1/2 in (216 mm)	8-1/2 in (216 mm)

Figure 3-21 Measurement Location Points for Wheel Angle Sensor Rods



1. Use a metal hack saw and vice as shown in *Figure 3-22* to cut the Wheel Angle Sensor linkage rods to the proper lengths.

Note: Protect the threads from damages while cutting the rods. It is advisable to attach a nut on the side of the linkage rod that is going to be kept in order to clean the threads after the cut has been made.

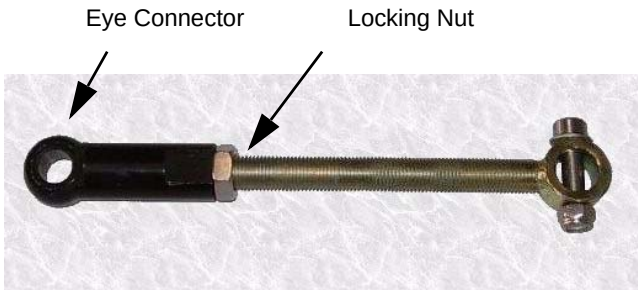
Figure 3-22 Linkage Rod Cutting

Assemble the Linkage Rod Hardware

After cutting the rods to the correct length, assemble the rods as described. The photos are provided as a reference only. The lengths of the actual rods will be different than what is shown in the pictures.

1. Attach the locking nut to Rod A.
2. Connect the eye connector to the end of the Wheel Angle Sensor rod. See *Figure 3-23*.

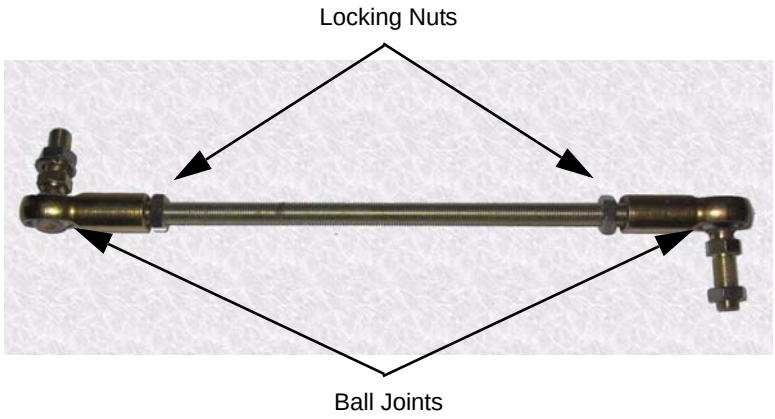
Figure 3-23 Wheel Angle Sensor Rod Assembled



3. Attach the locking nuts to each end of the linkage Rod B.
4. Attach the ball joints to both ends of the linkage arm. See *Figure 3-24*.

Note: The bolts for the ball joints should be facing the opposite direction as shown for this installation.

Figure 3-24 Wheel Angle Sensor Linkage Arm, Assembled



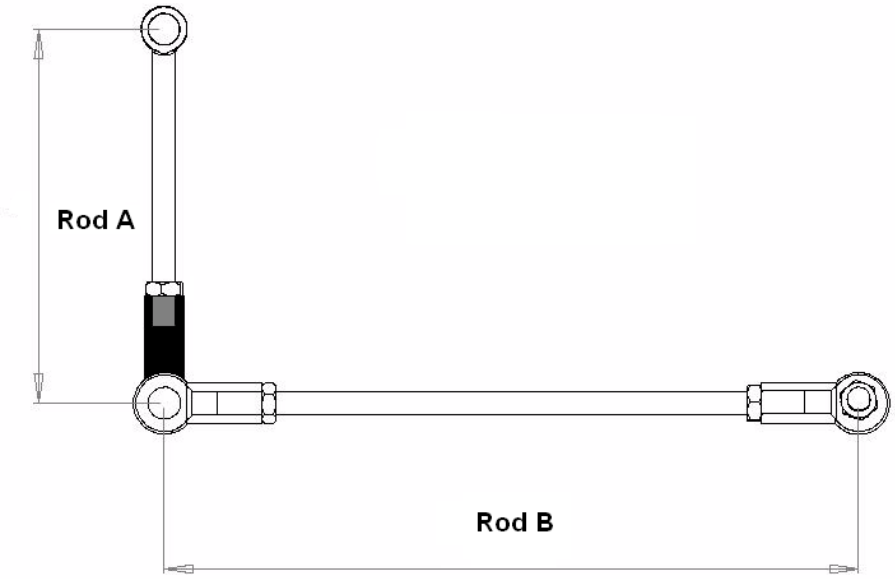
5. For most installations, use *Table 3-4* to adjust the lengths of the rod assemblies to the values shown. *Figure 3-25* shows where the measurement points for each rod are taken.

Note: Due to the variation of axle types and installation points, these measurements are provided as a reference only. Before connecting the steering rods and turning the steering axle verify that these lengths will work and the sensor will not be damaged.

Table 3-4 Assembled Linkage Rod Length

Rod ID	Option 1	Options 2	Option 3 Option 4
Rod A	3-3/8 in (86 mm)	4-1/4 in (108 mm)	5-1/2 in (140 mm)
Rod B	7-1/4 in (184 mm)	10-1/2 in (267 mm)	10-1/2 in (267 mm)

Figure 3-25 Assembled Linkage Rod Measurement Points

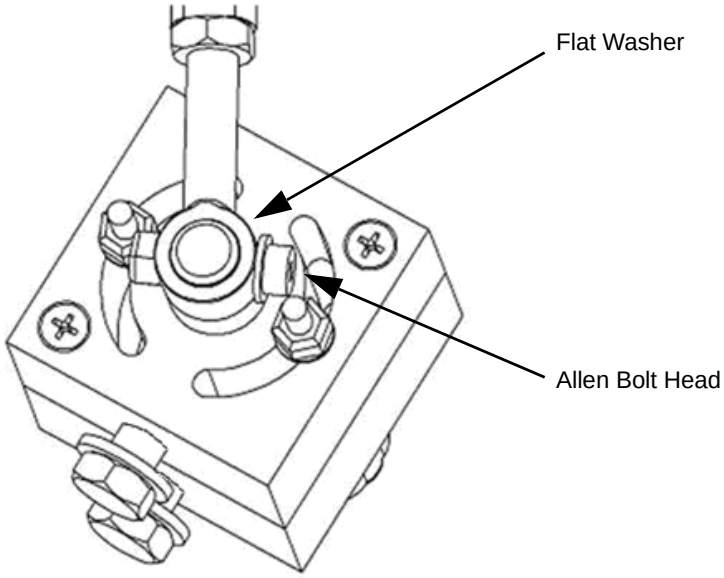


Attach Wheel Angle Sensor Rods to Brackets and Adjust

1. Attach the Wheel Angle Sensor rod to the Wheel Angle Sensor.

Note: The flat washer goes on the bolt head side and NOT the nut side when attaching the arm. See *Figure 3-26*.

Figure 3-26 Washer on Shaft Bolt



Note: The bolts should stick out of the bottom of the Wheel Angle Sensor and are used to prevent the Wheel Angle Sensor from being accidentally over extended by hand. Ensure these bolts are installed correctly. These bolts will not stop the hydraulics from over extending the sensor. Verify the fit prior to manually or automatically moving the Wheel Angle Sensor fully connected.

2. Tighten the bolt on the Wheel Angle Sensor shaft with a 1/8” Allen wrench and a 3/8” open end wrench.

3. Attach the linkage rod to the linkage bracket. The bolt attaches from below the “L” bracket and the nut and lock washer go on top. Tighten the ball joint to the bracket with a 1/2” and 9/16” wrench. The Option 1, Option 2, and Options 3 and 4 mountings are shown in *Figure 3-27*, *Figure 3-28*, and *Figure 3-29*.

Figure 3-27 Option 1

Figure 3-28 Option 2

Figure 3-29 Options 3 and 4

Note: Never attach the linkage rods to Wheel Angle Sensor rod and turn the steering wheels manual or automatically until the fit has been verified. The linkage rods must remain apart while the steering wheels are turned to the maximum right and left positions and then temporarily attached at these positions. Failure to do this may cause the Wheel Angle Sensor or vehicle to become damaged.

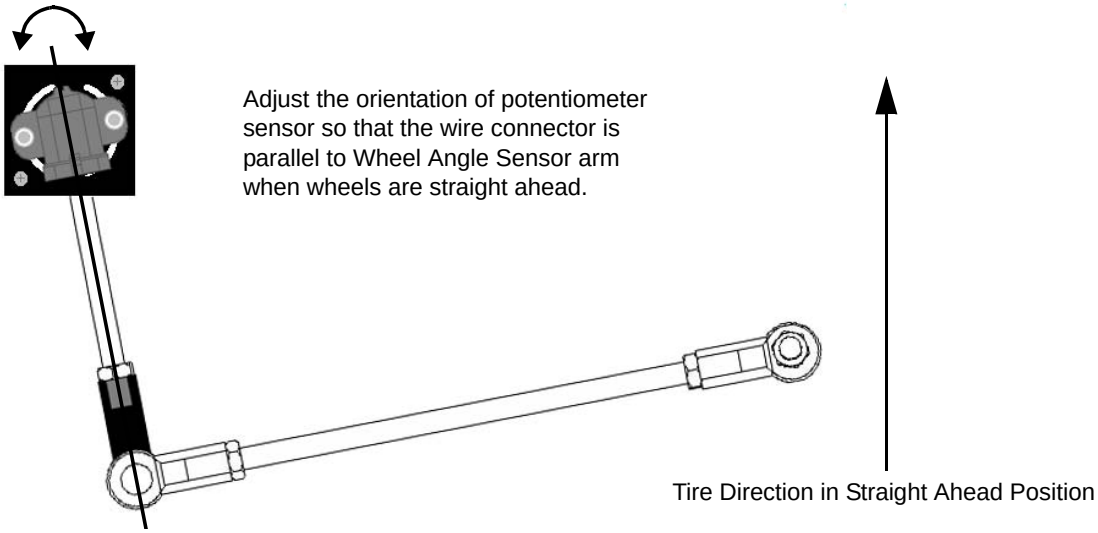
⚠ WARNING

Always shut down the vehicle when working around the steering axle and checking and adjusting the Wheel Angle Sensor rod lengths. The steering axle could move suddenly and cause severe injury or death.

Note: Before adjusting the Wheel Angle Sensor linkage rods, verify the steering wheels physical stops on the vehicle are adjusted to the maximum setting the vehicle operator is going to use. If these physical stops are changed after the Wheel Angle Sensor has been adjusted, the Wheel Angle Sensor could be damaged when the wheels are turned farther that what it was originally adjusted to work at.

4. With the linkage rods disconnected, start the vehicle and manually turn the steering wheel so that the vehicle will travel straight ahead when moving.
5. Temporarily attach the linkage rods together.
6. Rotate the Wheel Angle Sensor potentiometer on top of the mounting block so that the plastic wire connector is parallel to the Wheel Angle Sensor rod. See *Figure 3-30*.

Figure 3-30 Adjust Potentiometer Angle to Match Straight Ahead Wheel Position


Adjust the orientation of potentiometer sensor so that the wire connector is parallel to Wheel Angle Sensor arm when wheels are straight ahead.
Tire Direction in Straight Ahead Position

7. After the potentiometer has been adjusted, tighten the potentiometer bolts with a 3/8” wrench and 5/32” Allen wrench.
8. Disconnect the linkage rods and turn the steering wheel manually to the full left position.

Note: The vehicle may need to be driven a short distance in order to get the steering system to move to the full left position.

9. Reattach the linkage assembly and verify that the sensor or rods will not be damaged. Adjust the rod lengths as necessary. *Figure 3-31*, *Figure 3-32*, and *Figure 3-33* show the left turn installation for Option 1, Option 2, and Options 3 and 4.

Figure 3-31 Option 1

Figure 3-32 Option 2

Figure 3-33 Options 3 and 4

10. Disconnect the linkage rods and turn the steering wheel manually to the full right position.

Note: The vehicle may need to be driven a short distance in order to get the steering system to move to the full right position.

---

11. Reattach the linkage assembly and verify that the sensor will not be damaged. Adjust the rod lengths as necessary. *Figure 3-34*, *Figure 3-35*, and *Figure 3-36* show the right turn installation for Option 1, Option 2, and Options 3 and 4.

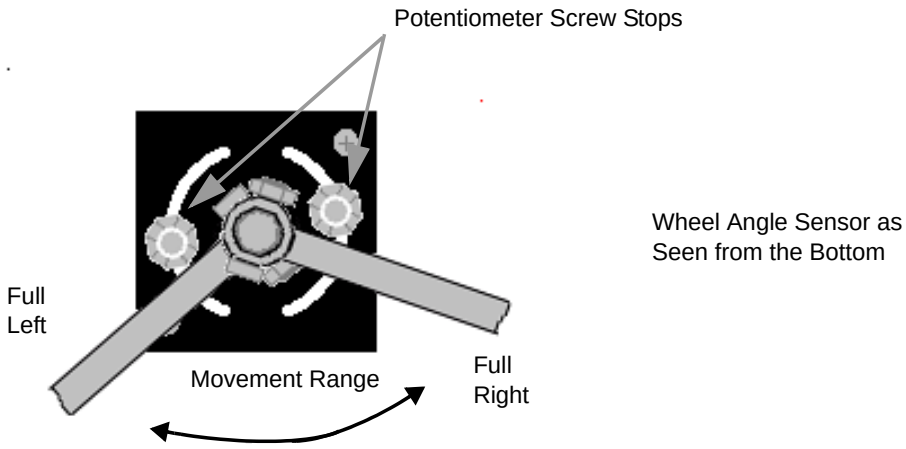
Figure 3-34 Option 1

Figure 3-35 Option 2

Figure 3-36 Options 3 and 4

12. Repeat *Step 4* through *Step 11* until the rod lengths have been adjusted and the potentiometer is centered to get the maximum sensor movement. The maximum movement is reached when the Wheel Angle Sensor rod will sweep from approximately 3/16” (5mm) from both bolt heads holding the potentiometer on to the block when the wheels are turned to the maximum right and left positions. See *Figure 3-37*.

Figure 3-37 Maximum Sensor Movement



Note: An Ohm meter can also be used to determine if there is enough sensor movement. Connect the Ohm meter to pins A and B of the Wheel Angle Sensor. Measure the Ohm reading at the maximum left and right position. After subtracting the smaller number from the larger number, there should be at least a 3.75 Kilo-Ohms change. The reading should also never go below 1.5 or higher than 6.6 Kilo-Ohms as this is reaching the limits of the potentiometer and could damage the sensor.

13. Once all the adjustments are complete, tighten all lock nuts and bolts on the linkage and Wheel Angle Sensor rod. A 1/2” and two 9/16” wrenches are required to tighten all the connections.

SA Module Installation

This **SA Module Installation** chapter contains information in the following sections:

- *SA Module Mounting Information*
- *Mount the SA Module*

SA Module Mounting Information

The SA Module can only be mounted in certain orientations. *Figure 4-1* shows the allowable mounting positions and *Figure 4-2* shows the incorrect mounting positions.

Figure 4-1 Correct SA Module Mounting Orientations

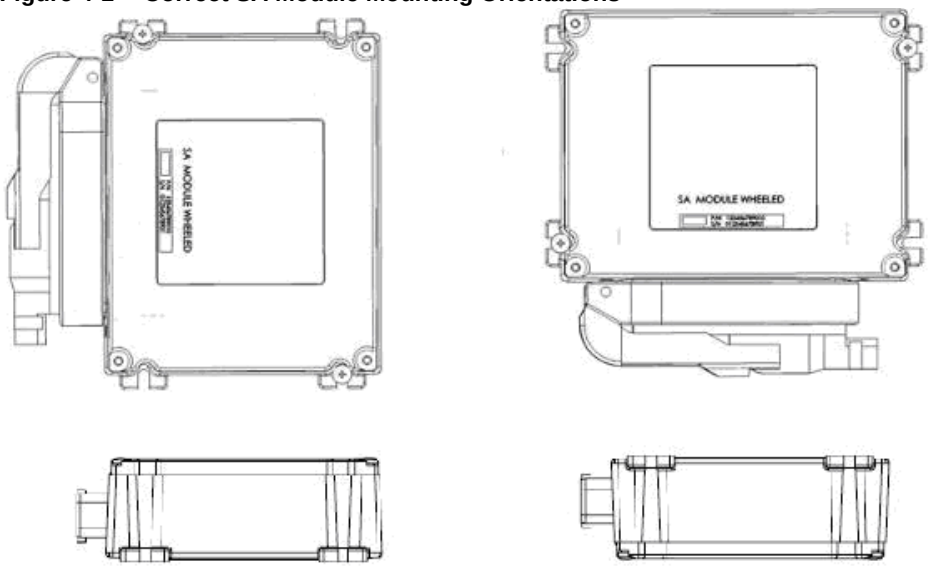
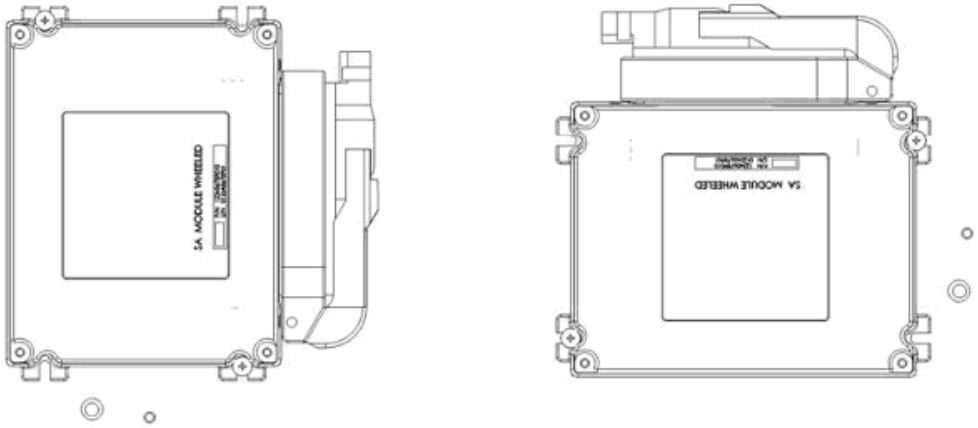


Figure 4-2 Incorrect SA Module Mounting Orientations



Mount the SA Module

Due to the variety of options available on vehicles and the possible configuration differences, it may be necessary to install the SA Module in a location other than the example shown here. If an alternative location is required, choose a location where the SA Module can be protected from damage caused by moving parts or crop debris and excessive moisture from weather and cleaning equipment.

1. Locate the hole on the left rear fender wall. See *Figure 4-3*.

Figure 4-3 Find SA Module Mounting Position

2. Attach the SA Module to the fender wall using a M8 x 20mm bolt, nut, and washer from the installation kit to the existing hole as shown in *Figure 4-4*.
3. Start the first two SA Module mounting screws.

Figure 4-4 Mount SA Module Bracket

4. Slide the SA Module into place.
5. Mount by installing the other two screws and tighten all four with a #2 Phillips screwdriver. See *Figure 4-5*.

Figure 4-5 Attach SA Module

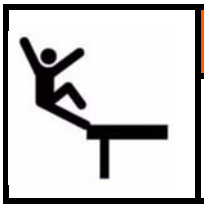
Roof Module Installation

This **Roof Module Installation** chapter contains information in the following sections:

- *Safety Notes*
- *Roof Rail Installation*

Safety Notes

- The AutoSteer system must be powered OFF when installing or removing the Roof Module.
- The Roof Module must always be firmly secured to the Roof Rail using the hardware whenever the vehicle is in operation to prevent the Roof Module from releasing from its bracket and falling.
- The Roof Module must be removed when transporting the vehicle at speeds above 30 mph (48 km/h).
- Ensure you are in a stable position on the vehicle or ladder when removing the Roof Module, so that you do not fall or drop the Roof Module.
- Use a ladder to install the Roof Rail.



WARNING

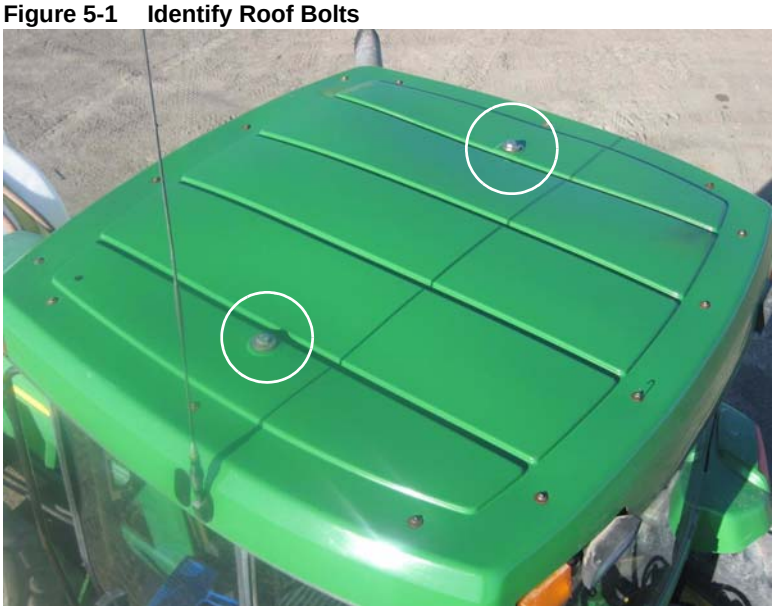
Ensure that you are in a stable position on the vehicle when installing or removing the Roof Rail and Roof Module so you do not fall.

Roof Rail Installation

1. Place the ladder as close as possible to the side of the cab.
2. Locate the roof bolts on top of the cab. Remove the two bolts and washers with a 15/16” socket and ratchet. See *Figure 5-1*.

Note: Save the bolts and washers for attaching the Roof Module bracket.

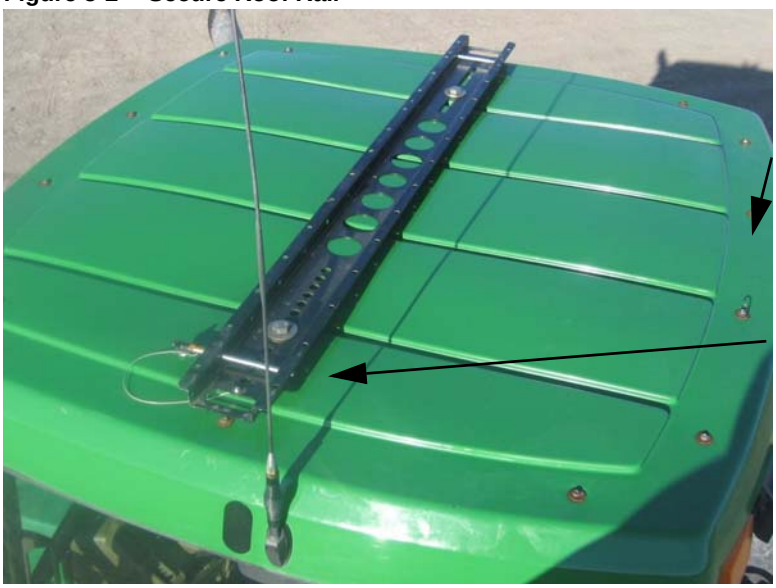
Figure 5-1 Identify Roof Bolts



3. Center the Roof Rail over the cab. Place the flat washers on top of the bracket and secure it to the roof with the bolts removed in the previous step. The locking pin should be on the left side of the roof. Tighten the bolts securely with a 15/16” socket and ratchet. See *Figure 5-2*.

Note: The bolts and washers supplied with the installation kit are supplied to be used for a different vehicle installation that uses the majority of the same parts. These parts are not used in this installation as the original bolts and washers are used instead.

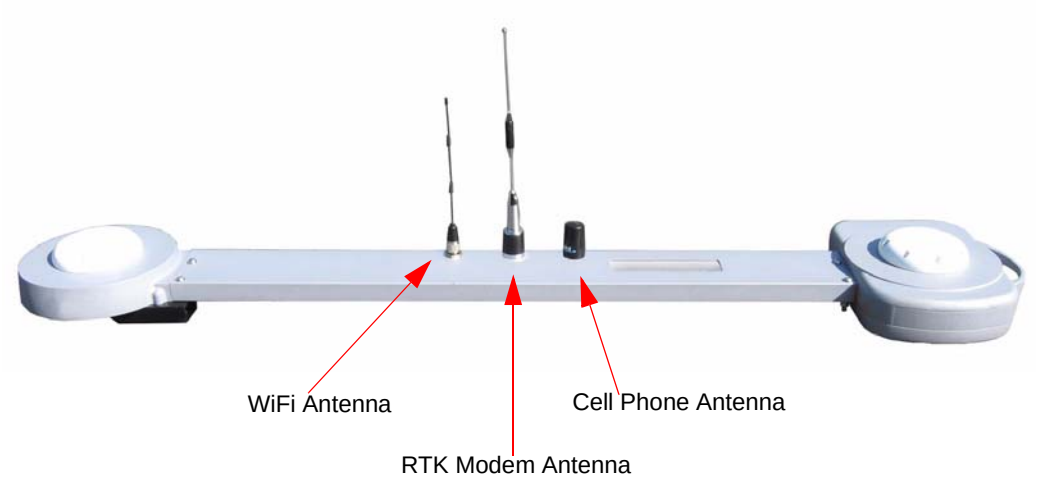
Figure 5-2 Secure Roof Rail



4. Attach the three antennas to the proper antennas connections on the Roof Module. See *Figure 5-3*.

Note: Hand tighten the connections. Do not over tighten.

Figure 5-3 Attach Antennas



5. Place the Roof Module on the Roof Rail so the cable connectors are on the left side of the cab.
6. Remove the locking pin from the Roof Rail. See *Figure 5-4*.

Figure 5-4 Remove Locking Pin

7. Readjust the Roof Module's position on the rail and then reinsert the locking pin to lock the Roof Module onto the vehicle. See *Figure 5-5*.

Figure 5-5 Reinstall Locking Pin

8. The Roof Module is now installed. See *Figure 5-6*.

Figure 5-6 Roof Module Attached

Display Installation

This **Display Installation** chapter contains information in the following sections:

- *Introduction*
- *Installation Procedure*

Introduction

This chapter provides the instructions for installing the RAM Mount Ball in the cab so that the Display can be attached later. Refer to your Display user manual for instructions on installing the Display. If the location shown for mounting the Display is being used by another piece of equipment, other mounting locations can be used. However, for best performance and ease of use, use the location shown in the installation manual.

Installation Procedure

1. Locate the accessory mounting bracket holes on the front right corner cab post. See *Figure 6-1*.

Note: If necessary remove any installed monitor brackets or hole covers to gain access to the mounting holes.

Figure 6-1 Locate Mounting Bracket Holes

2. Attach the Display bracket to the front corner post with two M10 x 35mm bolts and washers provided. See *Figure 6-2*.

Note: Two flat washers on each bolt must be placed between the Display bracket and the cab support to space the bracket far enough from the pillar to allow it to angle back towards the side window.

3. Tighten the bolts with a 17mm socket and ratchet.

Figure 6-2 Attach the Monitor Mounting Bracket

4. Attach the RAM Mount Ball to mounting bracket using the four screws and lock nuts provided. Tighten using a 3/8” wrench and #2 Phillips screwdriver. See *Figure 6-3*.

Figure 6-3 Attach RAM Mount Ball

Connect System Cables

This **Connecting System Cables** chapter provides information for connecting the Main Cable Harness and the SA Module Cable Harness to the various vehicle and AutoSteer components in the following sections:

- *SA Module Harness*
  - *SA Module Connection*
  - *Steering Valve Connection*
  - *Wheel Angle Sensor Connection*
  - *SA Power and Data Harness*
- *Main Cable Harness*
  - *SA Module Harness Connections*
  - *Main Cable Harness Connections Inside Cab*
- *Power Supply Connection*
  - *Cab Power Connection*
  - *Battery Power Connection*

SA Module Harness

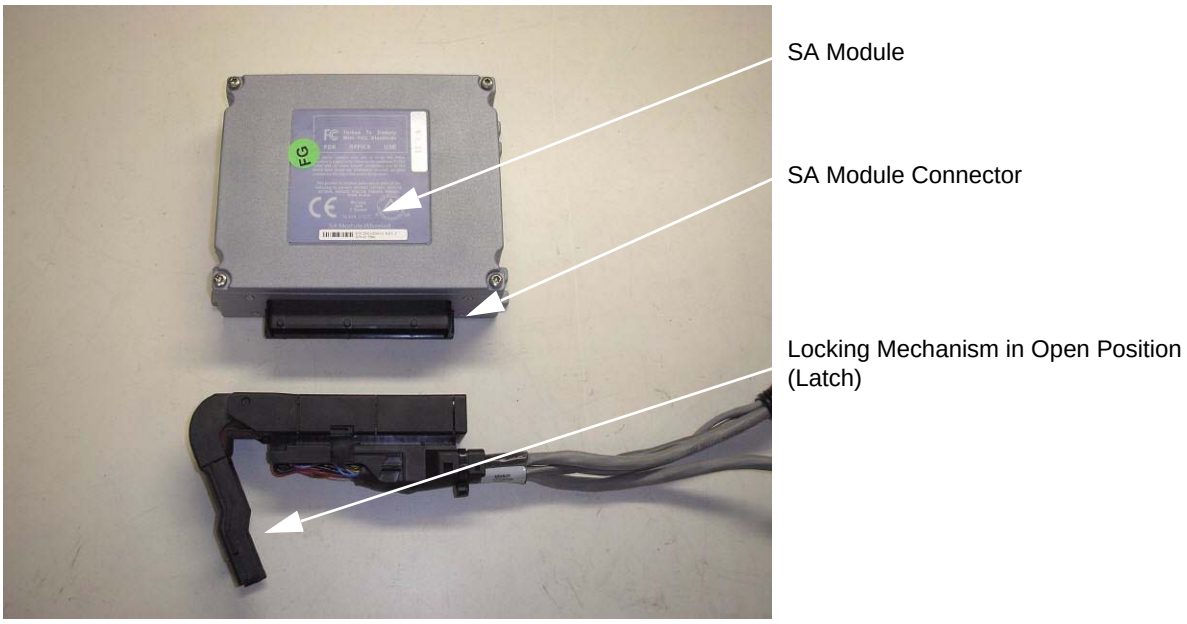
This **SA Module Harness** section contains the following sub-sections:

- *SA Module Connection*
- *Steering Valve Connection*
- *Wheel Angle Sensor Connection*
- *SA Power and Data Harness*

SA Module Connection

1. Align the SA Module Harness connector to the SA Module. See *Figure 7-1*.
2. Open the connector latch lever. See *Figure 7-1*.

Figure 7-1 Connecting SA Module Connector



3. Press the SA Module Harness connector onto the SA Module connector.

Note: You can damage the connectors if your force them into position. Do not force them together or use tools.

4. Press the latch lever closed until it clicks and locks the connector. See *Figure 7-2*.

Figure 7-2 Closing the SA Module Connector

Note: If you need to disconnect the SA Module connector, you must open the latch lever before attempting to pull the connectors apart.

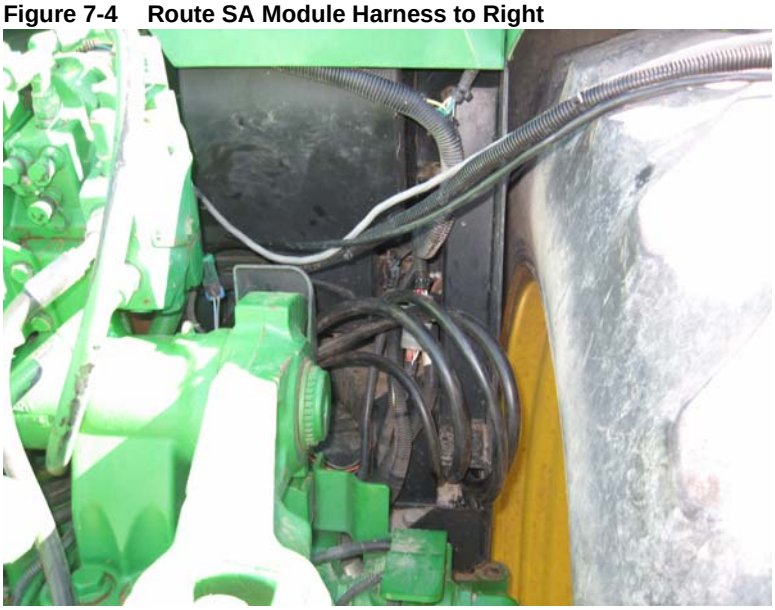
5. Close the cable connector locking mechanism as shown in *Figure 7-3*.

Figure 7-3 SA Module Connector (closed).

Steering Valve Connection

1. Route all the cables from the SA Module to the right, rear side of the cab. See *Figure 7-4*.

Figure 7-4 Route SA Module Harness to Right



2. Route the SA Module Harness's "JDW Enable" and "JDW Steering" connectors under the front, right side of the cab towards the Steering Valve.

Note: To save time run the cable labeled “JDW Pot” along the same route at the same time if installing a Wheel Angle Sensor.

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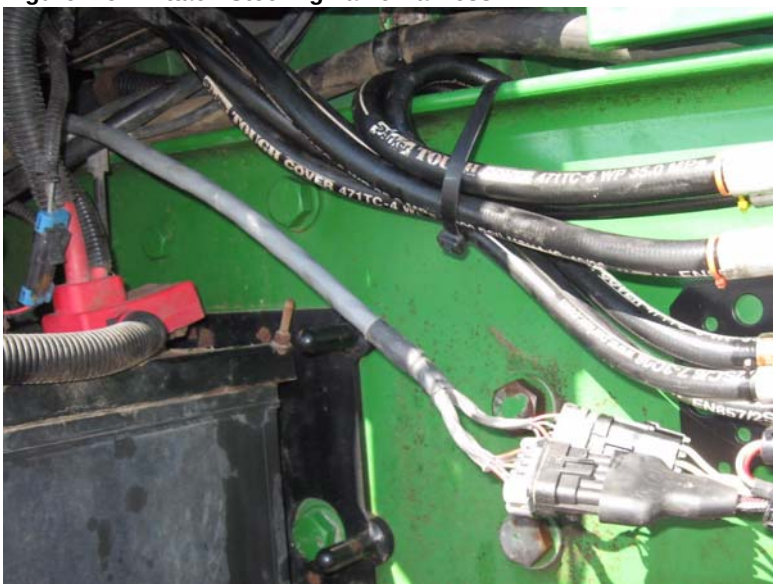
3. Connect the 12 pin “JDW Enable” and the 4 pin “JDW Steering” connectors to the Steering Valve Harness. See *Figure 7-5*.

Figure 7-5 Attach Steering Valve Harness



Wheel Angle Sensor Connection

Note: This connection to the Wheel Angle Sensor is only required when using the AutoSteer Wheel Angle Sensor.

1. Pull the SA Module Harness's "JDW Pot" cable forward following the steering lines towards the front, right axle where the Wheel Angle Sensor is mounted.
2. Attach the connector to the Wheel Angle Sensor and secure cable with cable ties as shown in *Figure 7-6*.

Note: *Figure 7-6* only shows one of the front axle configurations. For other axle options, follow a similar route. Verify the cable will not be damaged when the axle pivots.

Figure 7-6 Attach the Wheel Angle Sensor

SA Power and Data Harness

1. Open the rear cab window and remove the rubber grommet as shown in *Figure 7-7*.

Figure 7-7 Remove Grommet

2. Route the SA Module data and power harnesses up in to the cab as shown in *Figure 7-8*.

Figure 7-8 Route SA Module Power and Data Harnesses

3. Coil any excess SA Module Harness cables neatly and secure them with cable ties to prevent damages. Secure all cable runs to the sensors securely to prevent them from coming into contact with moving parts or the exhaust pipe. See *Figure 7-9*.

Figure 7-9 Coil Excessive Cables

4. Replace the rear shields removed earlier. See *Figure 7-10*.

Figure 7-10 Replace Rear Shields

5. Replace the battery covers. See *Figure 7-11*.

Note: Make sure the cables and hoses are not pinched when installing the covers.

Figure 7-11 Replace Battery Covers

Main Cable Harness

1. Attach the Main Cable Harness's “Roof Module” connector to the Roof Module. See *Figure 7-12*.

Orient the 12-pin connector so the word “TOP” on the cable connector is pointing upwards (towards the sky). Insert the cable connector into the Roof Module. Push the connector in until it “clicks” and locks in place. To remove, grasp the connector to compress the two side latches and pull away from the Roof Module.

Note: Do not force the connector. If the connector does not engage easily, check for the correct orientation of the connector.

Figure 7-12 Attach Roof Module Connector

2. Attach the LAN connector to the Roof Module. See *Figure 7-13*.

Orient the Ethernet cable connector with the connector under the receiver so the contacts on the cable connector are pointing towards the back of the vehicle. (This will usually be towards your right side if you are standing on the left side of the vehicle and looking towards the Roof Module.) Slide the cable connector into the receiver and rotate the plastic bayonet sleeve clockwise to lock the connector. The bayonet sleeve will “click” when it fully engages and locks. To remove the cable, rotate the bayonet sleeve counterclockwise until it “clicks” and pull the connector down or away from the Roof Module.

Note: Do not force the connector. If the connector does not engage easily, check for the correct orientation of the connector.

Figure 7-13 Roof Module Ethernet Connection

3. Cable tie the harness along the back of the Roof Rail as shown in *Figure 7-14*.

Note: Do not attach the cable ties around the top or bottom parts of the Roof Rail bracket as this will prevent the Roof Module from freely sliding along the Roof Rail when it is installed and removed.

Figure 7-14 Cable Tie Harness to Roof Rail

4. Route the Main Cable Harness down the right rear cab support as shown in *Figure 7-15*.

Figure 7-15 Route Main Cable Harness Down Cab Support

5. Attach the Main Cable Harness on top of the roof, to the top window bracket, and the bottom window bracket with metal wire clips provided with installation kit. Use an 8mm socket and ratchet for the bolt on top of the cab and a #3 Phillips screwdriver for the two window bracket screws.
6. Route the Main Cable Harness into the cab through the rear wire access port as shown in *Figure 7-16*.

Figure 7-16 Route Main Cable Harness into Cab

7. If necessary, cut a slot in the rubber grommet to allow the wires to pass through.
8. Reinstall the grommet as shown in *Figure 7-17* and close rear window.

Figure 7-17 Replace Grommet

SA Module Harness Connections

1. Connect Main Cable Harness's SA Module data and power cables to the SA Module Harness as shown in *Figure 7-18*.

Figure 7-18 Connect SA Module Data and Power

2. Neatly coil all harness wires and secure with cable ties. See *Figure 7-19*.

Figure 7-19 Coil Cables

Main Cable Harness Connections Inside Cab

Figure 7-20 shows the Main Cable Harness connections used inside the cab. *Table 7-1* shows the functions of the Main Cable Harness cab connectors. Refer to your Display user manual for instructions on connecting the Main Cable Harness connections shown to the correct ports and harnesses on the Display and Display cables.

Figure 7-20 Main Cable Harness Cab Connections

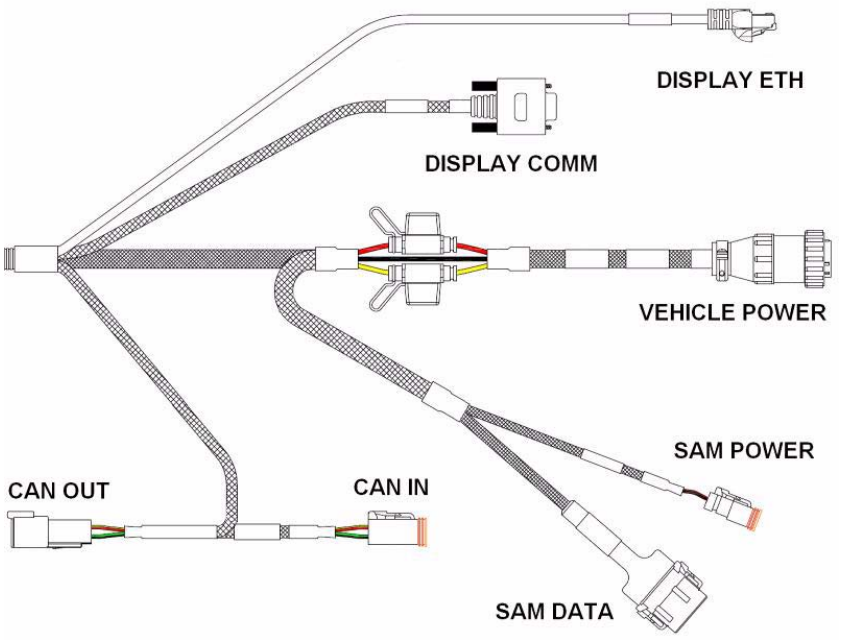


Table 7-1 Cab Main Cable Harness Connector Functions

Main Cable Harness Connector	Connector Function
DISPLAY ETH	Display Ethernet Port (RJ-45)
DISPLAY COMM	Display Communication Port (DB-9)
VEHICLE POWER	12 Volt Power
SAM POWER	Power for SA Module
SAM DATA	Data for SA Module
CAN IN	Not Used for This Installation
CAN OUT	Not Used for This Installation

Power Supply Connection

The following sub-sections describe basic instructions for connecting the AutoSteer system to available vehicle power sources:

- *Cab Power Connection*
- *Battery Power Connection*

Note: Refer to your Display user manual before connecting the AutoSteer system to vehicle power.

The Main Cable Harness must be connected to a 3-pin 12V power source. Your Display user manual provides specific instructions for connecting power to the AutoSteer system and specifies the appropriate vehicle power source.

Cab Power Connection

1. Locate the 12V power outlet on the upper, rear side of the side console behind the seat as shown in *Figure 7-21*.
2. Use this 12V accessory power connector only if the Display user manual specifies connecting to power inside the cab.

Figure 7-21 Accessory Port Power

Battery Power Connection

1. Locate the battery cover on the right-hand side of the cab beneath the steps as shown in *Figure 7-22*.

Figure 7-22 Battery Cover

2. Remove the battery cover to gain access to the batteries shown in *Figure 7-23*.

Figure 7-23 Batteries

3. Connect to the vehicle battery only if the Display user manual specifies a direct battery connection.

Note: A battery cable is provided with the AutoSteer system when a direct battery connection is required.

Post-Installation Procedures and Information

The **Post-Installation Procedures and Information** chapter provides information in the following sections:

- *Hydraulic Leak Check*
- *Create New Vehicle*
- *Pressure Relief Valve Adjustment*
- *Calibration and Tuning Guidelines*

Once the entire AutoSteer system, including the Display and display harnesses, have been installed on the vehicle, the procedures and notes provided in this chapter must be followed to complete the installation and prepare the vehicle for full AutoSteer capabilities.

Hydraulic Leak Check

On completion of installing the entire AutoSteer system including the Roof Module and Display, the system needs to be checked for leaks.

⚠ WARNING

High-Pressure Fluid Hazard

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.

⚠ WARNING

Prior to starting the vehicle, verify all people and equipment are clear from around the vehicle and the AutoSteer system is powered down. The vehicle could move unexpectedly and cause injury or death to bystanders.

1. Clear any bystanders away from the vehicle. If there is a hydraulic leak, they could be injured.
2. Put the vehicle into Park and/or set the park brake to prevent the vehicle from moving.
3. Turn the vehicle over for a few seconds and if the vehicle starts, immediately shut it down.
4. Walk around the vehicle and check all the hydraulic fittings that were opened. Look for any oil leaks.
5. Once all leaks have been repaired, or if none are found, start the vehicle again and let it run at a low idle.

Note: If an oil leak is noticed during any part of this test, immediately shut down the vehicle and repair the leak.

6. Take the vehicle out of Park and/or remove the parking brake. Turn the steering wheel manually to the right and left stops two or three times to get any air out of the hoses.
7. Confirm the wheels on the steering axle turn in the correct direction and that the steering system steers the same as it did before the AutoSteer system was installed.
8. Put the vehicle back into Park and/or reset the parking brake. Shut down the vehicle, walk around it again, and check for any hydraulic leaks.
9. Once the leaks have been repaired, or if none are found, start the vehicle again and let it run at a low idle.
10. Take the vehicle out of Park and/or remove the parking brake. Move the vehicle to an open, flat area and leave the vehicle running.
11. Power up the AutoSteer Display.
12. Follow the instructions in the Display user manual to navigate to the **Vehicle** window from the **AutoSteer Setup** screen. Select **Steering Components**, then select **Hydraulic Valve**. If the safety screen requirements have been met, press the **Continue** button.
13. Press the **Steer Right** and the **Steer Left** buttons several times to force the wheels to turn back and forth. The wheels should turn in the direction it is commanded. If the wheels turn in the wrong direction, the hoses were attached to the wrong ports on the Steering Valve and need to be switched.
14. Power down the Display, put the vehicle into Park and/or reset the parking brake, and shutdown the vehicle.
15. Once again check the vehicle for hydraulic leaks and repair any that are found.

Create New Vehicle

Note: Do not start the vehicle until after the Hydraulic Leak Test has been performed on the vehicle.

The operator must first create a new vehicle profile. This configures the system so the Display can properly communicate with the various sensors and components on the vehicle.

1. Ensure that the vehicle is still in Park and/or the park brake is set to prevent the vehicle from moving.
2. Ensure the vehicle is off. Do not start the vehicle yet.
3. Power up the AutoSteer system.
4. Follow the instructions provided in the Display user manual to create a new vehicle.

Note: Select **Hydraulic Steering Valve** as the controller for the specific vehicle model when setting up your vehicle on the AutoSteer system Display.

5. When the setup wizard gets to the **Calibration and Tuning** screen, exit from the wizard and shut down the AutoSteer system.

Pressure Relief Valve Adjustment

The Steering Valve has a built-in Load Sense Relief Valve that limits the maximum pump pressure when AutoSteering. The Pressure Relief Valve must be adjusted after the entire AutoSteer system has been installed and the system has been checked for hydraulic leaks. The Display, Roof Module, and all harnesses must be connected prior to performing this procedure.

⚠ WARNING

High-Pressure Fluid Hazard

Read this manual before installation. Wear hand and eye protection while performing hydraulic system maintenance. Relieve hydraulic system pressure before servicing the hydraulic system.

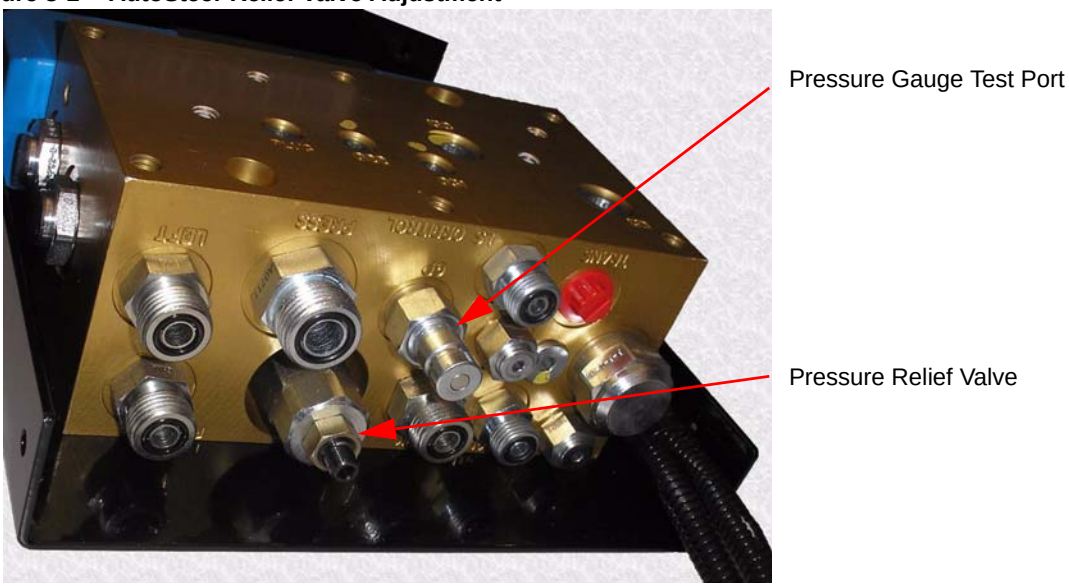
⚠ WARNING

Prior to starting the vehicle, verify all people and equipment are clear from around the vehicle and the AutoSteer system is powered down. The vehicle could move unexpectedly and cause injury or death to bystanders.

Note: Always shut down the vehicle prior to adjusting the Pressure Relief Valve set screw.

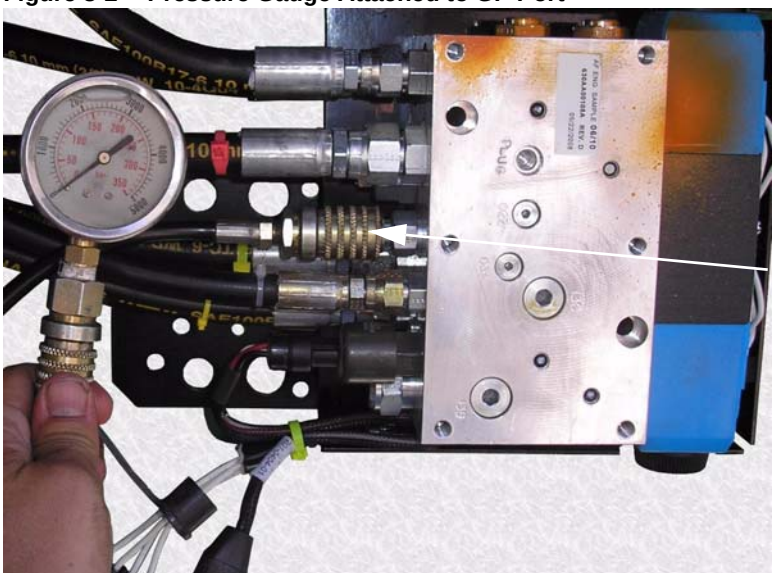
Note: The Pressure Relief Valve in *Figure 8-1* is shown without the hydraulic hoses connected for ease of viewing the Pressure Relief Valve and pressure Test port. When actually adjusting the Relief Valve, do so with the Relief Valve mounted on the vehicle, the hydraulic hoses connected, and the rest of the AutoSteer system installed and operational.

Figure 8-1 AutoSteer Relief Valve Adjustment



1. Ensure that the vehicle is still in Park and/or the park brake is set to prevent the vehicle from moving and the engine is off.
2. Clear any bystanders from around the vehicle to prevent anyone getting injured when the steering wheels are moved in the following steps.
3. Attach a short extension hose to the quick attach diagnostics port labeled GP on the Steering Valve. Attach a 5000 psi pressure gauge to the extension hose. See *Figure 8-2*.

Figure 8-2 Pressure Gauge Attached to GP Port



4. With a 1/2” wrench and 5/32” Allen wrench, loosen the jam nut holding the Pressure Relief Valve adjustment screw as shown in *Figure 8-3*.

Note: *Figure 8-3* shows the Steering Valve with the hoses disconnected for clarity. The Steering Valve must be fully connected to the vehicle to adjust the Pressure Relief Valve.

Figure 8-3 Loosening the Lock Nut on Relief Valve

5. Turn the adjustment screw counter-clockwise two turns to lower the pressure.
6. Start the vehicle and leave the engine at a low idle.
7. Check the standby pump pressure shown on the pressure gauge. The standby pressure should be around 200 PSI (14 Bar) to 500 PSI (24 Bar).

Note: If the standby pump pressure is zero or less than 100 PSI (7 Bar), the Pressure and Return/Tank hoses may have been inverted. Confirm the hoses have been attached properly before continuing. If the standby pump pressure is above 1000 PSI (69 Bar), it is too high. Determine what is causing the pressure to spool up and repair before moving on. Two most likely causes are that some of the hoses have been inverted or an incorrect orifice or plug has been installed in the Steering Valve.

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8. Record the actual standby pressure: _____ PSI (Bar).
9. Restart the vehicle and check the maximum steering pressure by turning the steering wheels until they hit the wheel stops.
10. Record the actual maximum steering pressure: _____ PSI (Bar).

11. Power up the AutoSteer Display.

12. Follow the instructions in the Display user manual to navigate to the Vehicle window from the AutoSteer **Setup** screen. Select **Steering Components**, and then select **Hydraulic Valve**. If the safety screen requirements have been met, press the **Continue** button.

13. Press the **Steer Right** button to command the wheels to turn to the right. Allow the steering axle to reach the right stop and hold it there.

14. The maximum pump pressure allowed by the AutoSteer valve will be displayed on the pressure gauge.

15. Turn off the vehicle and the AutoSteer Display.

Note: Do not adjust the Pressure Relief Valve with the engine running as there is a chance that a person could get injured if the steered wheels or the tractor move while working on the Pressure Relief Valve.

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16. Adjust the Relief Valve screw clockwise to increase pressure and counter-clockwise to decrease pressure with a 5/32" Allen wrench.

17. Repeat *Step 11* through *Step 16* until the maximum steering pressure in AutoSteer mode at *Step 14* is **2465 psi** +/- 100 psi.

18. Once the Pressure Relief Valve has been adjusted properly, retighten the jam nut with a 1/2" wrench while holding the adjustment screw with a 5/32" Allen wrench to lock it into place.

19. Record the final maximum pressure the Pressure Relieve Valve is set to: _____ PSI (Bar).

20. Press the **Stop** button and confirm that the pressure drops back to the standby pressure within a second. If the pump pressure remains high after pressing the **Stop** button, the pump is remaining stroked up. To resolve this in most cases, replace the load sense drain plug in port **13A** on the AutoSteer valve with the 0.022" orifice.

21. Shut down the AutoSteer Display, turn off the engine, and remove the pressure gauge from the Steering Valve by sliding the sleeve on the quick release coupler

22. Replace the Steering Valve cover on the valve and tighten the four Allen screws with 3/16" Allen wrench.

Calibration and Tuning Guidelines

Note: For optimal steering performance, the AutoSteer system must be fully calibrated and then tuned.

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1. After finishing the previous procedures, start the vehicle and move it to an open area.

2. Power up the AutoSteer Display.

3. Follow the instructions in the Display user manual to navigate to the **Vehicle** window from the AutoSteer Setup screen. The current vehicle should have already been set up and selected during the *Create New Vehicle* section, if not, select the current vehicle profile in the **Manage Vehicle** screen.

4. Select **Auto Calibrate** from the Vehicle screen and follow the on screen procedure to calibrate the vehicle.

5. Once the calibration has completed, follow the instructions provided by the Display user manual to tune the vehicle if performance is not adequate.

Final Hardware Installation Checklist

This **Final Checklist** chapter contains the verifications steps necessary after the installation of the AutoSteer system.

Note: The Final Hardware Installation Checklist is on the back of this page. Tear this page out of your manual and fill in the checklist after the installation. You should keep a copy of this checklist for future reference when servicing the vehicle.

Machine Model: _____ Year: _____ Serial #: _____

Customer Name: _____

Location/Address: _____

AutoSteer Installation Kit Part Number: _____

NOTES

_____

_____

_____

_____

_____

_____

Name of Installer: _____ Date: _____

System Installation Checklist

1. Wheel Angle Sensor installed and all fasteners are tight. (optional) ☐
2. Display Bracket is installed and all fasteners are tight. ☐
3. Display is installed and all fasteners are tight. ☐
4. Roof Rail and Roof Module are installed and all fasteners are tight. ☐
5. SA Module is installed and all fasteners are tight. ☐
6. All cable ends are connected. ☐
7. All cables are secured with cable ties. ☐

Hydraulic Installation Checklist

1. Steering Valve Bracket is installed and all fasteners are tight. ☐
2. Steering Valve is installed and all fasteners are tight. ☐
3. All hose fittings are tight. ☐
4. Check for oil leaks on all hydraulic connections. ☐
5. All hoses are routed and secured with cable ties. ☐
6. Manual steering is normal after the AutoSteer installation. ☐
7. Relief Valve is adjusted. ☐ Static:_____ ☐ Manual:_____ ☐ AutoSteer:_____

AutoSteer Performance Checklist

1. Complete AutoSteer system calibration. ☐
2. Complete AutoSteer system tuning. ☐
3. Check total Wheel Angle Sensor counts. (if installed) ☐ Left:_____ ☐ Center:_____ ☐ Right:_____
4. Line acquisition is satisfactory. ☐
5. On-line steering is satisfactory. ☐
6. Manual override (kick-out) is working. ☐ Static:_____ ☐ Kick-out:_____
7. Check that Manual Steering speed is the same as before the installation. ☐
8. Steering speed from lock-to-lock is satisfactory. ☐ Value_____Sec.

Note: See the *Post-Installation Procedures and Information* chapter for additional information.